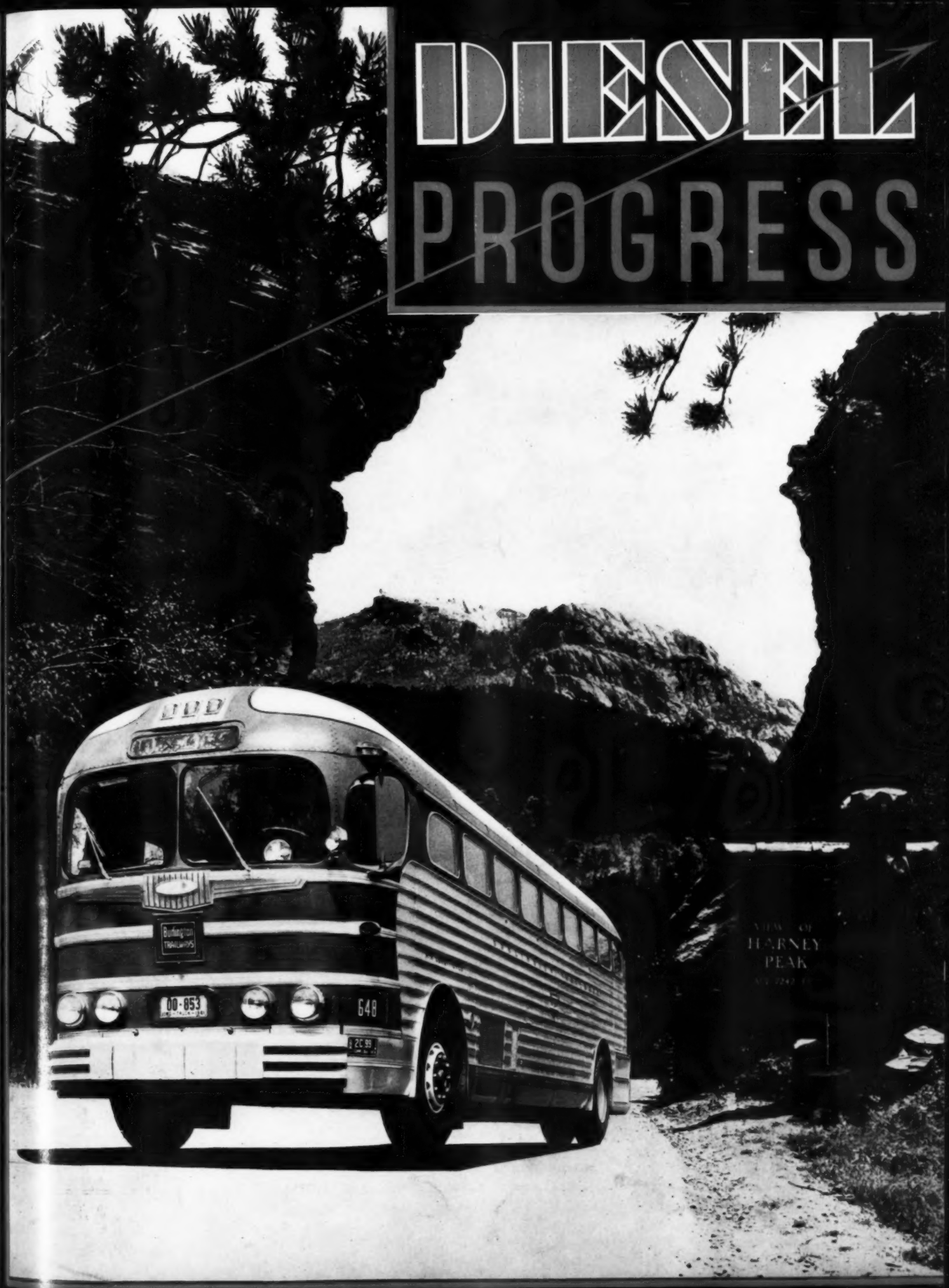
DIESEL PROGRESS



SEPTEMBER, 1943

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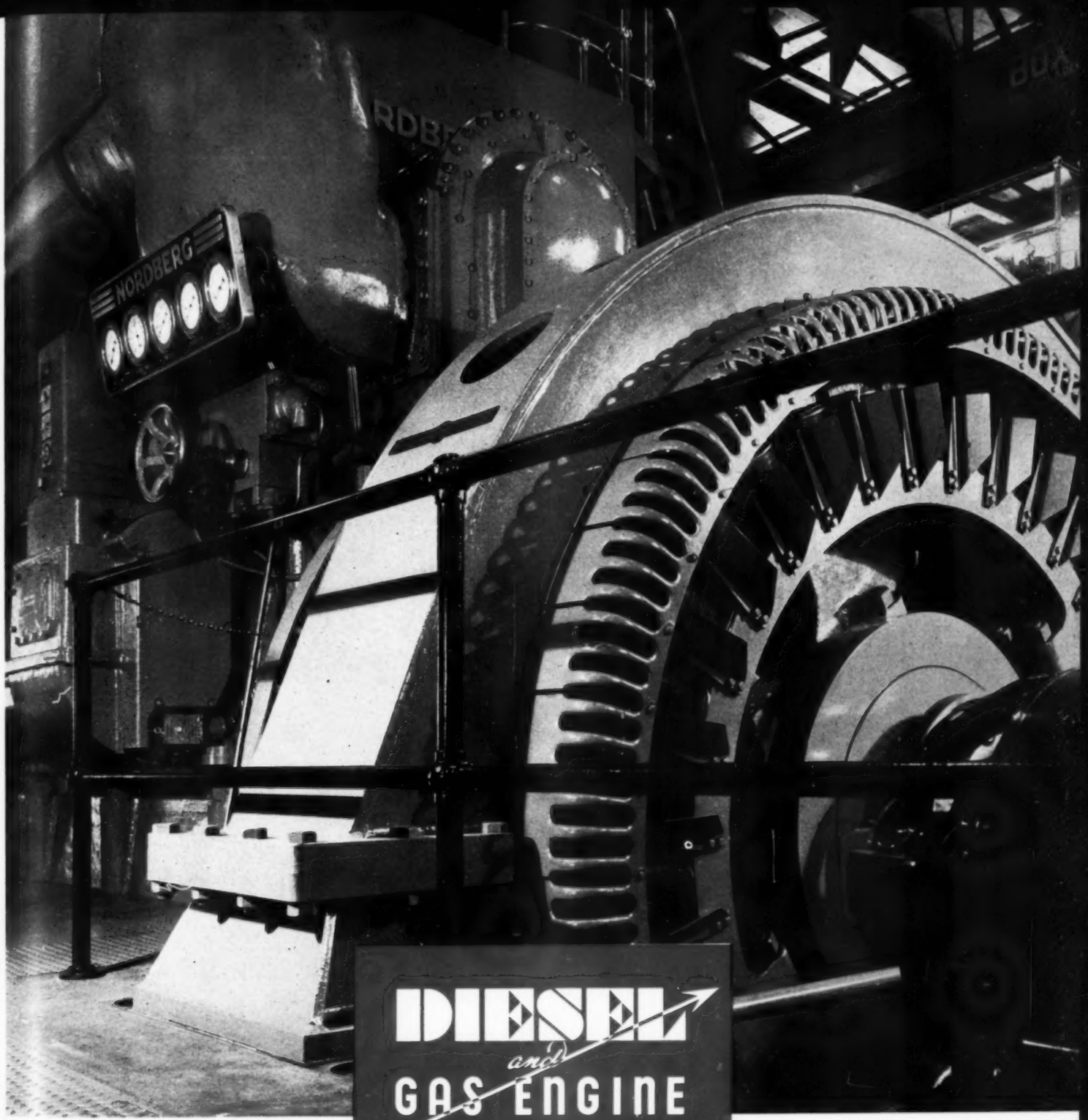
DIESEL PROGRESS, for September, 1943, Volume IX, Number 9. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 2 W. Forty-fifth St., New York 19, N. Rex W. Wadman, President. Acceptance under the Act of June 5, 1943, at East Stroudsburg, Pa., authorized March 27, 1940. Subscription rates: $5.00 per year, single copy, 5



DIESEL and GAS ENGINE PROGRESS

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Art Director

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National Business
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FRONT COVER ILLUSTRATION: A Burlington Trailways DieselLiner enroute through the Nevada Mountains. Burlington operates 52 of these deluxe buses built by General Motors and powered with G.M. Diesels.

TABLE OF CONTENTS ILLUSTRATION: Operating end of the new 5000 hp. Nordberg Diesel and 2000 kw. General Electric alternator at South Norwalk, (Connecticut) Electric Works.

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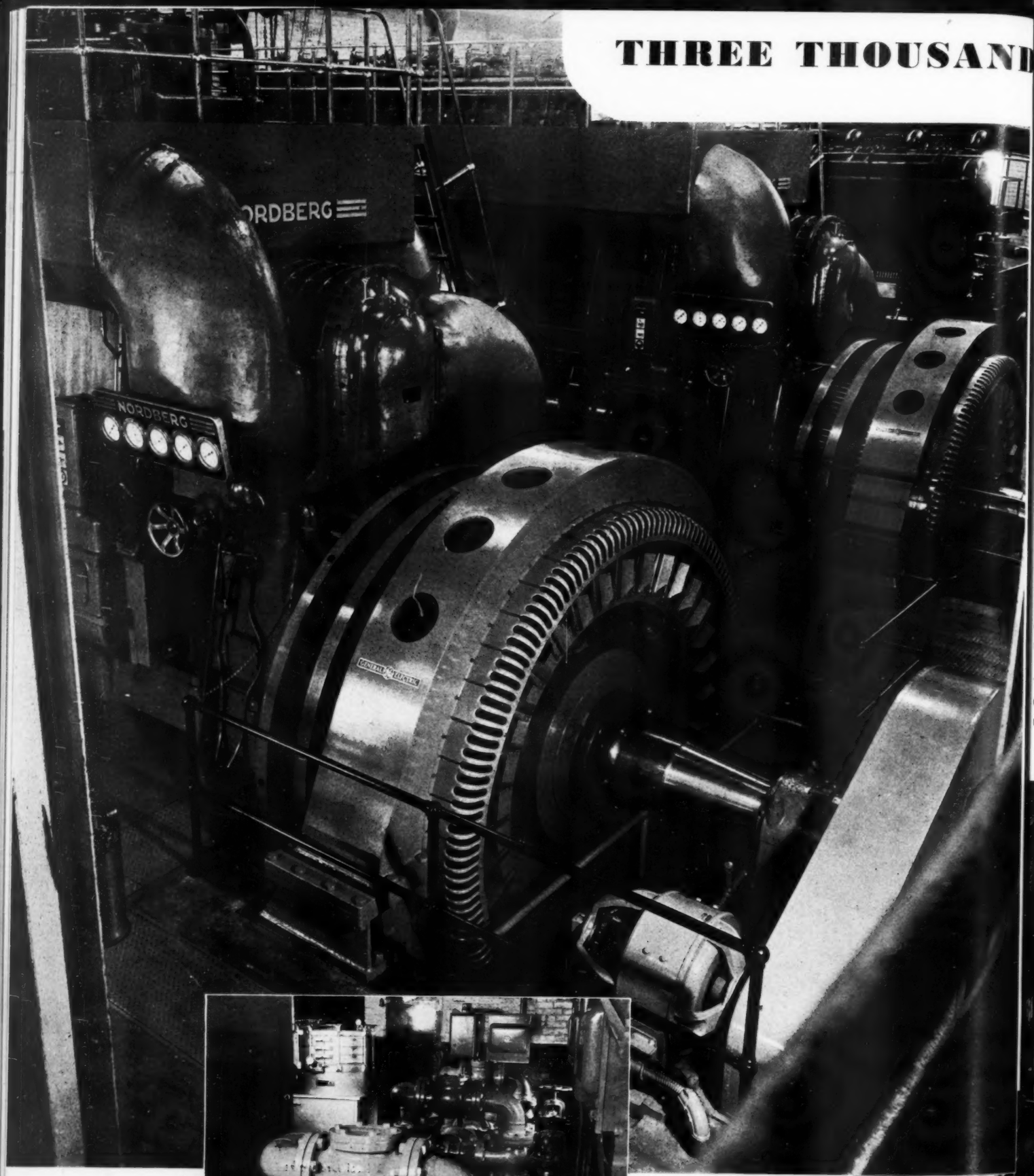
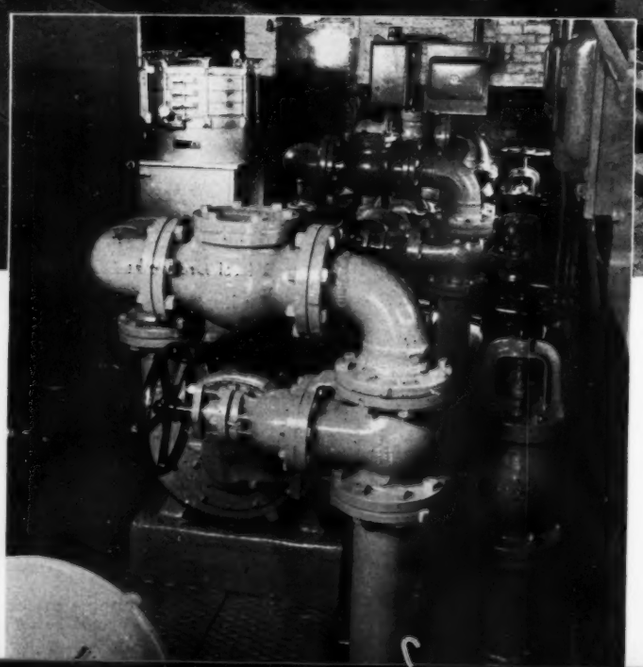
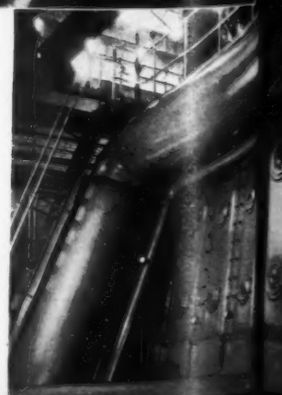
THREE THOUSAND





Right: Jennings circulating water pumps, foreground, and Hilco lube oil reclaimer, background.

Operating ends of the two 3000 hp. Nordberg Diesels and 2000 kw. G.E. generators. The 1600 hp. McIntosh & Seymour Diesel is seen in the background.



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October 1892
two dynamos

MORE HORSEPOWER

FOR SOUTH NORWALK, CONNECTICUT

By WILBUR W. YOUNG

ON December 31, 1942 the Board of Electrical Commissioners of the Second Taxing District, City of Norwalk, Connecticut made its Fiftieth annual report announcing the addition to the plant of a second 3000 hp. Nordberg Diesel during the year as well as some dollar statistics that could mean only one thing—successful operation. Any community not enjoying the benefits of municipal ownership and operation of its electric utility or those waiting for post-war delivery of equipment or still those that have been propagandized into doubt can find all the answers to questions of economy and operation in the unbroken fifty-year success record of the South Norwalk Electric Works.

The history of the plant places its beginning in October 1892 with a 100 hp. steam engine and two dynamos of 60 arc lamps capacity each used to light the streets each night "until the moon comes up!" The farsighted and progressive spirit of this community is shown, however, in the fact that its first Diesel was put in service in 1905—since when there have been nothing but Diesel prime movers added to the plant. For a complete historical sketch of the South Norwalk Electric Works see DIESEL PROGRESS for February, 1941.

The meat of our present consideration is contained in the accompanying chart of operating figures and in the following revenue and expense figures.

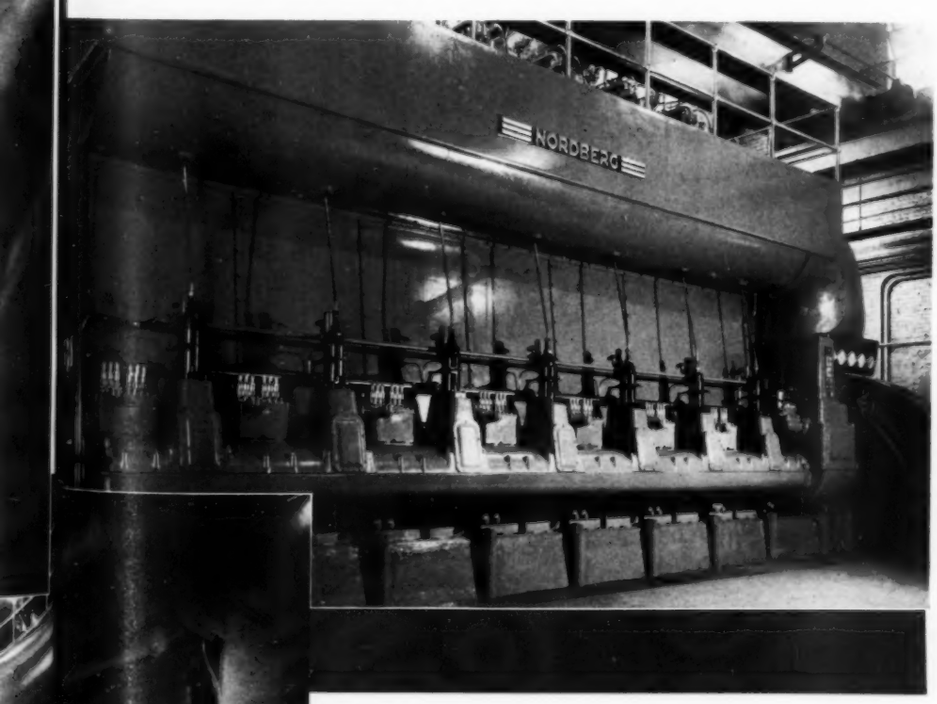
For the period January 1 to December 31, 1942, the operating revenue was $328,708.91; expense was $187,936.57 and net income was $92,097.15 after depreciation of $50,209.99. That's what is left after serving the community not only well—but at moderate rates and furnishing all street lighting gratis. But that is not all. During the period ending on December 1942 over one half million dollars was paid out of the earnings of this plant in dividends to taxpayers. This money was appropriated to assist taxpayers through the elimination of tax in the district.

Any community would consider this a highly desirable state of affairs and if they ask the secret, E. J. Splan as General Superintendent would say from his standpoint that it depends on good machinery, maintained in top condition and a working force of conscientious people who are treated like human beings—all backed by a progressive Board of Electrical Commissioners—the present incumbents being Oliver F. Dorward, President; John A. O'Conner, Secretary; and Marshall E. Hoyt, Treasurer. In other words Mr. Splan has no secrets else we could not publish his operating records. But lest you miss a salient point in this South Norwalk operation let us emphasize the fact that it is entirely divorced from politics. It is interesting to note also in this connection, that all installations and improvements during 1942 were made by the plant staff, which speaks well for the ability of this organization.

The new generating unit which was put in service in February 1942 is an exact duplicate of the 7-cylinder, 3000 hp., 2 cycle Nordberg Diesel and 2000 kw. General Electric alternator which preceded it in December 1941. These two units, supplemented by an earlier 1600 hp. McIntosh & Seymour Diesel and 1,110 kw. G.E. generator give this plant a total capacity of 7185 hp. The addition of 450 kw. of capacitors for power factor improvement in 1942 proved beneficial to overall operating results.

The operating figures best express the efficiency of this equipment. The big Nordberg Diesels are certainly clean in outward appearance and a great deal may be said for the effective combining of enclosures with easy accessibility to all vital operating parts.

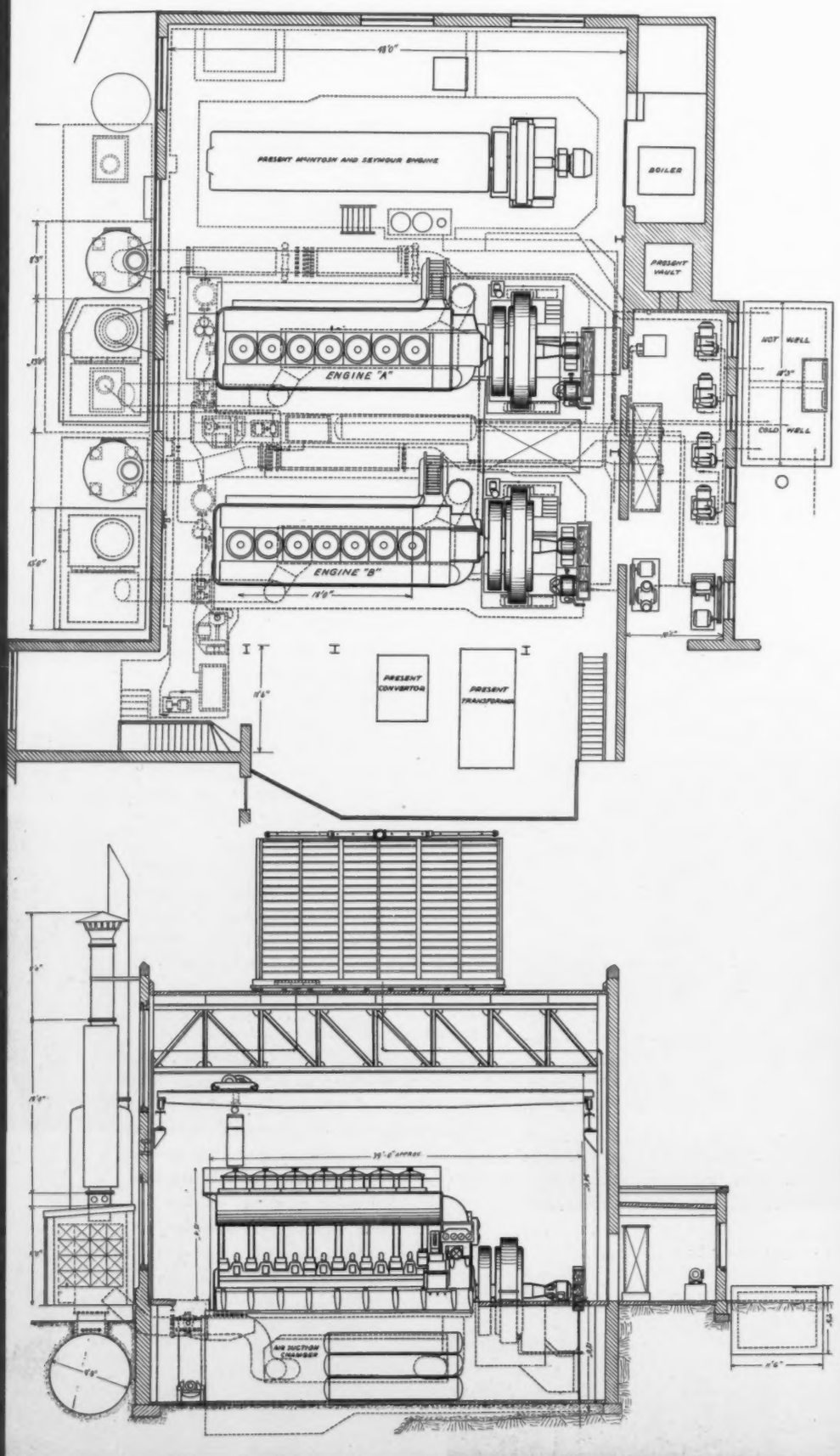
Arrangement of the plant accessories is especially tidy. Adjacent to the engine room are circulating water pumps, air compressors, lube oil reclaimer and tanks for clean and dirty lube oil. In the basement, where space is limited are the air bottles, oil coolers, fuel and lube pumps, meters, and day service fuel tanks. Water, lube and fuel pipes are easily traced by their distinguishing colors; red for fuel, green for lube and black for water.



This Nordberg 3000 hp. Diesel went "on the line" in February 1942. Note Manzel lubricators, American Bosch fuel injection pumps and Woodward governor. Left: Note accessibility to crankcase through large removable panels.

Force feed lubricators on the three Diesels are Manzel. The Nordbergs are fitted with American-Bosch fuel injection pumps, Woodward IC governors, Roots-Connersville scavenging blowers, and Alnor pyrometers. Burgess intake and exhaust snubbers are mounted vertically along the outside south wall of the building where the American intake air filters are also located. Above, on the roof are the Fluor raw water cooling towers. Fuel is filtered through Nugent duplex units and metered by Pittsburgh Equitable meters. A Hilco batch unit handles reclamation of lube. The lube coolers for the two big Nordberg Diesels are Schutte and Koerting. Both fuel and lube throughout the plant are Gulf products. The circulating water pumps are Jennings, manufactured by Nash Engineering Co. and one air compressor is a Gardner Denver, the other a 3-stage, 1000 psi. machine is a product of The Norwalk Company. A Cummins, 6-cylinder Diesel and GE 40 kw. dc generator are installed for supplying current to the McIntosh and Seymour auxiliaries in emergencies. The modern, desk type General Electric switchboard occupies a prominent place on the mezzanine–overlooking the engine floor.

The present general superintendent, Edward J. Splan was, prior to his efficient administration of the South Norwalk Electric Works, connected with the Gulf Oil Corporation for eighteen years. It can be said that the South Norwalk electric works is one of the finest equipped plants in the United States, modern and excellently maintained in every respect and its personnel is devoting its entire ability and effort toward perpetuating an unbroken record of profitable performance for the citizens of the Second Taxing District.



Left: Plan and end elevation of the plant arrangement.

Month

Month	
Dec.	194
Jan.	194
Feb.	194
Mar.	"
Apr.	"
May	"
June	"
July	"
Aug.	"
Sept.	"
Oct.	"
Nov.	"
Dec.	"
Jan.	194
Feb.	"
Mar.	"
Apr.	"
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June	"
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Sept.	"
Oct.	"
Nov.	"
Dec.	"
Jan.	194
Totals	
RUNNING	
FUEL OIL	
LUBRICAT	
POWER CO	

PERFORMANCE DATA - SOUTH NORWALK, CONN.

2 NORDBERG 3000 B.H.P./2115 K.W. DIESELS - ONE ENGINE UNTIL MARCH, 1942.

Month	K. W. H. Gross	K. W. H. Aux.	K. W. H. Net	Gals. Fuel	KWH/Gal.Fuel Gross	KWH/Gal.Fuel Net	Engine Hours	Gals. Cyl.	Lube Oil Crankcase
Dec. 1940	331,600	7,680	323,920	24,449	13.56	13.25	248	68-1/4	0
Jan. 1941	403,600	8,990	394,610	29,221	13.75	13.50	297	103	59
Feb. 1941	320,000	7,560	312,440	22,926	13.97	13.64	238	85-1/4	0
Mar. "	260,800	7,350	253,450	19,041	13.70	13.31	217	63-3/4	0
Apr. "	295,200	7,250	287,950	21,517	13.72	13.39	215	59-1/2	0
May "	198,100	5,240	192,860	14,592	13.58	13.20	147	40-1/2	0
June "	314,700	7,910	306,790	23,265	13.50	13.19	223	64-3/4	156
July "	316,200	8,110	308,090	23,699	13.34	13.00	212	62	0
Aug. "	105,100	2,750	102,350	7,923	13.27	12.92	75	21-1/4	0
Sept. "	190,800	4,530	186,270	14,010	13.53	13.21	126	39	0
Oct. "	474,000	10,410	463,590	34,703	13.66	13.36	316	93	216
Nov. "	455,600	9,650	445,950	32,931	13.84	13.54	288	79-1/2	270
Dec. "	605,100	11,350	593,750	42,977	14.08	13.81	370	90-1/4	0
Jan. 1942	546,000	10,110	535,890	39,322	13.88	13.63	335	81-3/4	162
Feb. "	450,900	9,050	441,850	32,098	14.05	13.77	288	89-3/4	0
Mar. "	421,600	8,990	412,610	31,492	13.39	13.10	276	94-3/4	0
Apr. "	427,900	9,230	418,670	31,785	13.46	13.17	306	109-1/2	0
May "	412,900	9,700	403,200	31,106	13.28	12.96	290	103-1/4	158-1/2
June "	468,900	10,990	457,910	35,434	13.23	12.92	319	103-3/4	0
July "	495,300	11,300	484,000	37,581	13.20	12.88	331	104-1/4	130-3/4
Aug. "	477,800	11,700	466,100	36,048	13.25	12.96	335	99	227
Sept. "	493,600	11,220	482,380	36,627	13.48	13.17	344	106-1/2	0
Oct. "	650,400	15,270	635,130	48,713	13.35	13.04	456	135-1/2	365
Nov. "	663,200	14,250	648,950	49,104	13.51	13.22	442	135	219
Dec. "	746,000	14,890	731,110	53,199	14.02	13.74	477	147-1/4	109-1/2
Jan. 1943	591,400	11,980	579,420	42,443	13.93	13.65	393	111-3/4	0
Totals	11,116,700	247,460	10,869,240	816,206	13.62	13.32	7,564	2292	2072-3/4

RUNNING ENGINE CAPACITY FACTOR = $\frac{\text{Engine Output in Gross KWH x 100}}{\text{K.W.Rating x Hours Operated}} = \frac{1,111,670,000}{2115 \times 7564} = 69.5\%$

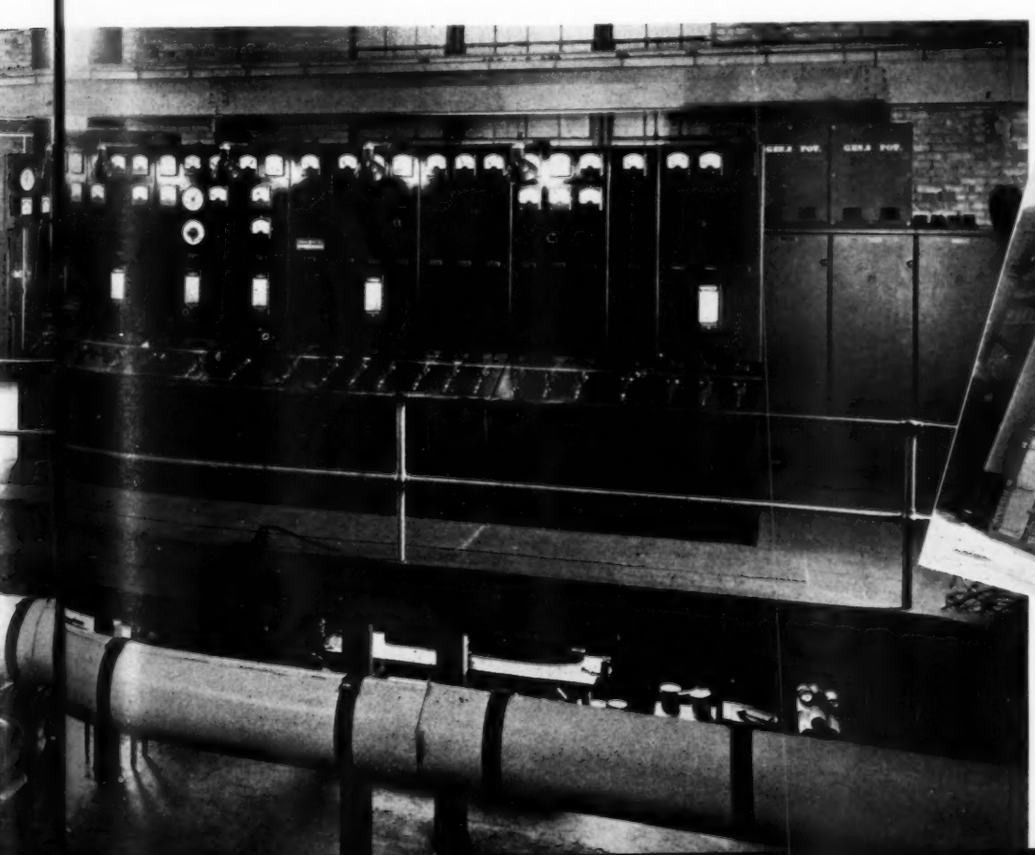
FUEL OIL CONSUMPTION = $\frac{\text{Total Gross K.W.H.}}{\text{Total Gals.Fuel Oil}} = \frac{11,116,700}{816,206} = 13.62$ Gross K.W.H./gal

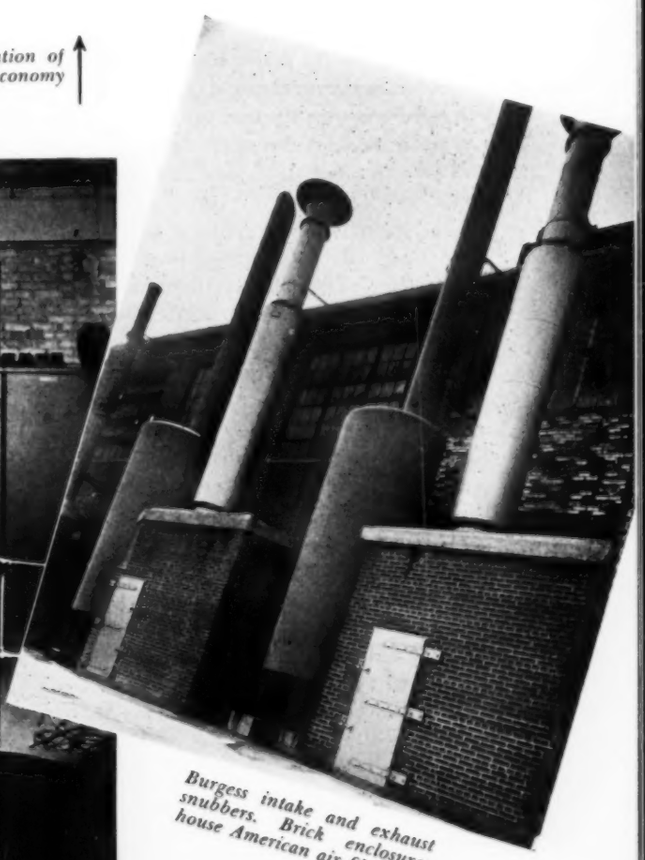
LUBRICATING OIL CONSUMPTION = $\frac{\text{BHP Rating x Total Hrs.Operated}}{\text{Total Gals. Lub. Oil Consumed}} = \frac{3000 \times 7564}{4364\text{-}3/4} = 5199$ rated BHP Hrs./Gal

POWER CONSUMED BY ENGINE AUXILIAIRES = $\frac{\text{Total Aux.K.W.H. x 100}}{\text{Gross K.W.H.}} = \frac{24,746,000}{11,116,700} = 2.23\%$

Below: The modern G.E.-made and equipped switchboard. ↓

An unusually complete tabulation of performance data. Note fuel economy and engine capacity factor. ↑





Burgess intake and exhaust snubbers. Brick enclosures house American air filters.

BURLINGTON DIESELINERS

By CHARLES F. A. MANN

NINE years ago the Chicago, Burlington & Quincy Railroad electrified the world with their first Burlington Zephyr—the world's first Diesel streamlined train.

Not only did this progressive key American system inaugurate Diesel motive power of a brand new type, in addition to inaugurating the railroad version of its application, but it opened the door to a whole series of radical innovations of practical utility in the design and operation of railway rolling stock that have since become the standard pattern throughout the world. Stainless steel construction, full roller bearing journals, sealed windows, soundproofing, lightweight design actually stronger than the clumsy oxcart designs it replaced, ultra high speed and ultra low fares in combination with artistic luxuriousness of interiors unheard of in previous concepts of train design.

Transportation men will remember that the era of Diesel railroad power was born almost the same time that long-haul bus operation reached its first, and almost invariably unprofitable peak. For months the theory of low-cost, long distance bus travel had been bringing in the passengers throughout the USA, in direct competition with the old, slow, dirty 3½ cents-a-mile railroad coach competition. But few bus operators on the long hauls were making money.

Bus transportation, like Topsy, had simply evolved from the jitney, urban, suburban, cross-state, regional and finally transcontinental pattern, generally along routes paralleling railroads. And in this era, about the beginning of the reign of Franklin I, in 1932, most of the railroads were going into the bus business in a great big way.

Rear end view of Burlington DieseLiner showing functional design of stainless steel engine compartment grille combining structural and ventilation requirements.

The Burlington railroad system, naturally found itself in the bus business in a large way, and in many instances its streamlined train development parallelled the bus routes that did all right locally but not so good on the long-haul.

Adopting the same far-sighted attitude that lead to the evolution of the Zephyrs in 1934, the Burlington Transportation Company in 1938 set out to design a long-haul bus devoid of all the bugs that drove passengers off the other bus types, and tacked on every conceivable new idea in design, equipment and power that could be found, borrowing ideas from the day coaches on the Zephyrs as well as from their head-end power plants, all within sound economic limitations and within the safe handling limitations of a single bus driver.

As usual, the Burlington Bus idea was carefully thought through from way down to the installation of an automatic water cooler-drinking fountain, the Diesel plant, the stainless steel exterior and on up to a nation-wide advertising campaign replete with a copyrighted name for the new buses that tied in the magic of the word Diesel in the ears of slogan-minded Americans, and the word Air Conditioned, resulting

3,000,000 MILES AND NO GAS RATION WORRIES!

A Burlington DieseLiner passing through Salt Lake City.

Interior view of the DeLuxe bus. Note water fountain, rear.

in the birth of: "Burlington Trailways Air-Conditioned DieseLiners."

The first 21 of these Diesel buses went into service in 1939 amid the planned fanfare of prevues in hundreds of towns both on and off the Trailways route, wisely letting the villagers inspect and poke around (they found this out with the Zephyrs), and a barrage of publicity based on the words "Air Conditioned DieseLiners" in every newspaper and magazine. The publicity barrage was not based on a clever hooey campaign to convert a great, but unprofitable Railroad Bus subsidiary into a paying one, but managed as the inauguration of a new idea in Bus travel. In other words when the Public began to have the itch to buy a ticket and ride a DieseLiner, they came, were pleased and went away boosting, for all the nice things the Burlington said about the new wrinkles in bus design turned out to be the absolute truth, and they were able to deliver the goods, "As Advertised—On the Advertised," on the long hot runs in the Far West in Summer, and the cold, windy Winter runs in the mid-west. Now there are 52 DieseLiners in the Burlington fleet.

The DieseLiners, products of General Motors, were built of shotwelded Stainless steel; they were welded and bolted and riveted togther so well that after 500,000 miles of operation, about the time the normal engine wears out, they are still squeakless and have no structural bulges and sags nor cracks worked loose to let dust and fumes inside. The baggage compartment beneath did away with the overhead nuisance of lugging it inside, and the passengers rode on top of the load instead of in the middle.

The double-paned shatterproof glass idea was borrowed from the Zephyr trains and fitted so tightly in the frames that rattling windows, fogged glass or variable ventilation due to passengers monkeying with the windows, vanished into the Limbo. The railroad practice of using matted hair insulation, celotex, sponge rubber at metal to metal contacts, in compression, mechanical design as near vibrationless as possible to make, insulated roofs, acoustic ceiling tiles, and finally forced draft mechanical hot and cold air conditioning replete with humidity controls; removal of four seats in the customary 37 seat Transcontinental bus design to give more leg room, centerline lighting in shatterproof plastic glass tubing, individual seat lights, ash trays, linen head rests and sponge rubber upholstered seats—all proved the Burlington Zephyrs helped create the DieseLiner bus idea. The whole object of the design was to make the passenger feel like he was riding in a railroad train, and only the contour of the road or the bumps, if any, would be felt or heard by the bus passenger. In other words if the DieseLiner rode rough, blame the State Highway officials—not the Burlington Trailways!

Mechanically they went a long way too, not only inside the bus itself, but straight down to the system of inspection and overhaul, adopting the standard Railroad practice based on total mileage attained for each typical overhaul schedule, corresponding closely with the I.C.C. standard locomotive inspection schedule.

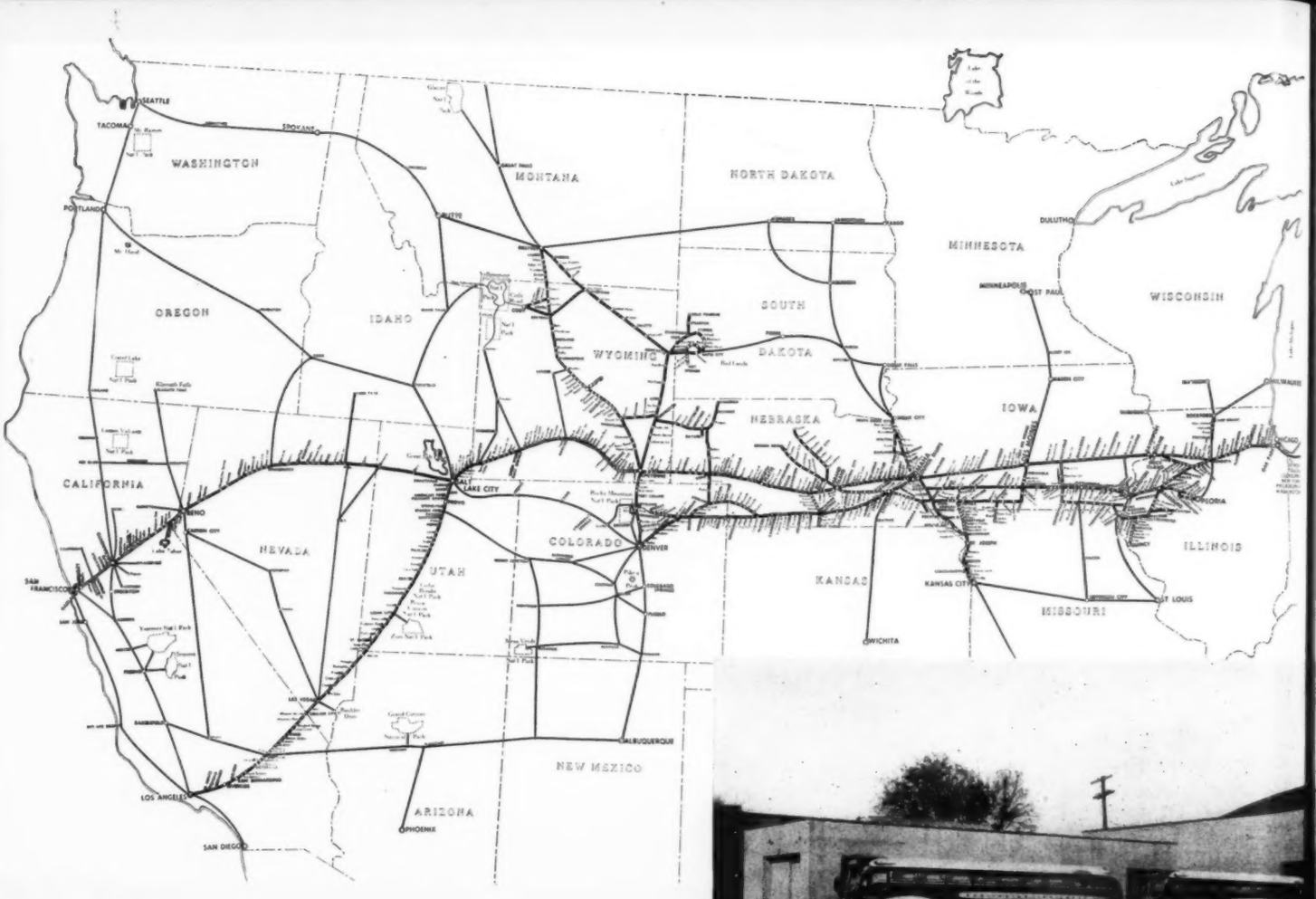
Besides educating the drivers, maintenance force, the mechanics, etc., and setting up printed schedules to follow, it necessitated establishing bus shops in Omaha and Salt Lake City—sort of bus roundhouses or general shops.

In 1939 the Burlington Transportation System was operating in the red. In 1942—three operating years out from the time DieseLiners were installed, the System showed an increase of 278% in gross operating revenues over the 1939 period!

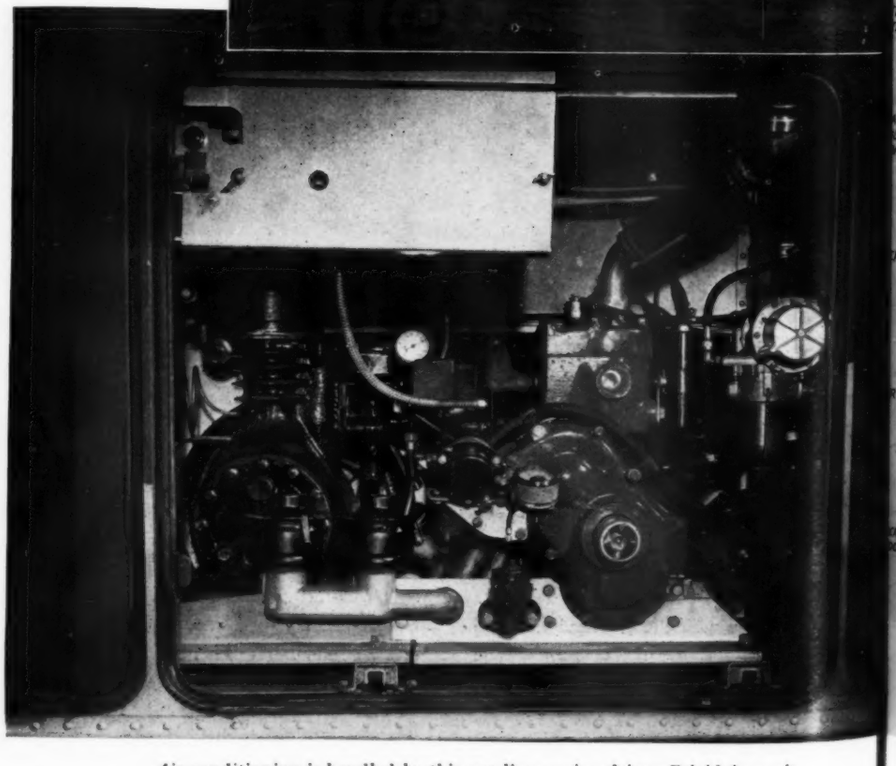
In May, 1943, the Burlington Trailways had recorded a total of 25,738,656 miles of DieseLiner operation, broken down into an astonishing total of 14,623,751 miles for the fleet of 21 original Diesel buses, one of which has accumulated a staggering total of 827,734 miles all by itself! The second fleet of 20 DieseLiners have piled up 7,245,754 miles of operation since 1940 and the third fleet of 20 put into service in 1941 has piled up 3,869,151 miles. And the total now is growing at the rate of over a million miles a month on a route totalling 4326 miles covering the entire area from Chicago to the Pacific Coast at San Francisco and Los Angeles.

The accompanying map will give a better idea of how extensive the Burlington network is, covering the key trunk route from Chicago to Omaha via both Des Moines and Burlington-Ottumwa, with branches down to Kansas City. From Salt Lake City two main trunks extend to San Francisco and Los Angeles and from Omaha to Denver, a total of more than half of the entire Burlington Trailways bus system.

Five different maintenance and overhaul schedules are adhered to, the routine maintenance 1-5000 mile Form A; the 6,000 mile form B inspection; the more mechanically-slanted 25,000 mile form C; the Diesel Engine mechanical form D at 50,000 to 65,000 miles and the complete overhaul form E for 120,000 miles or more which often necessitates major engine rebuild jobs or body work of extensive nature, and complete tests of scavenging air pressure, exhaust back pressure and the little used parts of the bus that never wear out.



Colored routes are DieseLiner operated, comprising one-half of the Trailways System.



Air conditioning is handled by this gasoline engine driven Frigidaire unit.

The bus design, as mentioned before, embraces the latest practices throughout, with air braking, large excess capacity electric system, gayly decorated interiors with full reclining, widely spaced seats and all comforts necessary for long-haul journeys.

The air conditioning system is double-acting—that is a full forced draft ventilating system with two control positions for both heating and cooling the air. The system forces some 1200 cubic feet of air every 1.3 minutes into the bus and out again, through perforated conduits, in the latest approved manner that permits a foul pipe addict to puff away on his terrible pet brand of smoking tobacco in the seat just ahead of the dear old lady that cannot even stand the smell of modern Youth-Allure perfumes! And still be friends at the end of the run! This calls for gallon-sized ash trays, too, as well as folding footrests and frequently changed linen head rests. The result of all this planning is an amazingly comfortable, soundproof, odor-proof ride comparable with the best type of railroad or airplane practice.

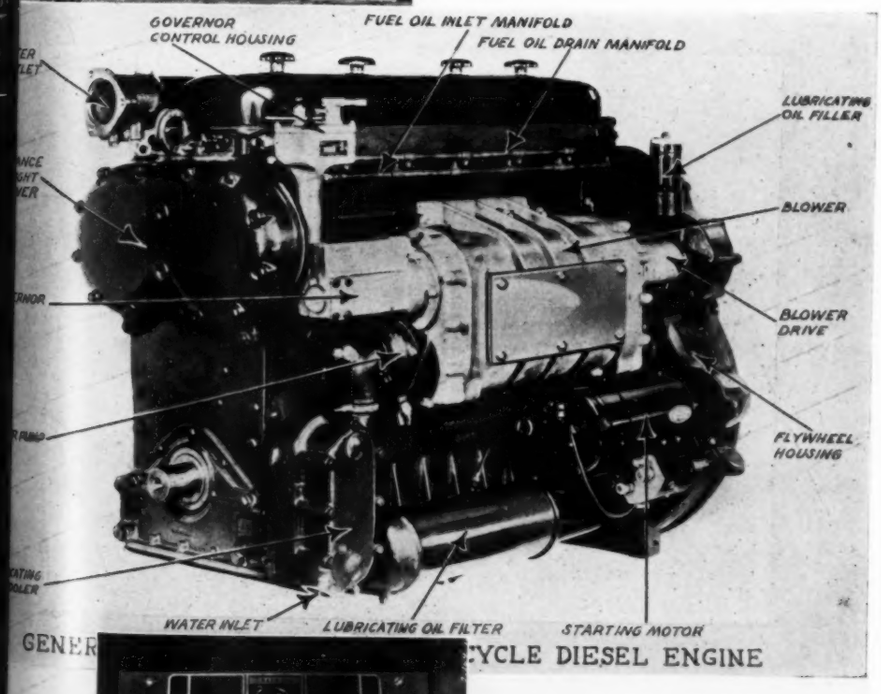
The cooling part of the air conditioning system, all of which is controlled from a small individual panel near the driver's seat, is operated by a small 4 cylinder gasoline engine mounted in a sliding tray underneath the bus, operating a Freon refrigerant compressor, with suitable cooling and heating radiation, auxiliary fans, etc., of ample capacity for perfect cooling in the hottest plains or desert weather. Cold weather heating is supplied of course, from engine radiator water through a separate pump circuit. We forgot to mention the tricky venetian blinds over all windows that shut out the summer sun or assure a complete blackout at night when the inside is fully lit up.

Salt Lake City general shop where DieseLiners are overhauled.

The main power plant is a 6 cylinder General Motors, 2 cycle, 165 hp., medium high speed Diesel engine, mounted transversely at the rear, with all controls, radiators, etc. in one large compartment and light enough in weight to keep the load balance in perfect proportions on the dual rear tired and single tired front wheels, another feature that makes the bus easy to operate and the passengers in all parts of the bus given a smooth ride.

The Diesel plant has the following characteristics:

Model 6-71—GM. 2 Cycle—1200 rpm.
Bore: 4½ in.; Stroke—6 in.; 425.3 cu. in. Displacement
Maximum horsepower 165; BMEP—70 lbs. continuous rating
Compression ratio 16:1
Piston Speed at 1,000 rpm.: 833 ft. per min.
Firing order: 1-5-3-6-2-4-
Weight, dry: 1597 lbs.
Water capacity 21.5 quarts.
Engine weights include all auxiliaries, including fuel, lube, water pumps.
Electric starting
Rotary scavenging blower.



Above: General Motors 6-cylinder, 2-cycle Diesel which powers the DieseLiners. Left: Complete control of heating, cooling and ventilating is centered in this unit mounted at the driver's right.

The two-cycle Diesel has proved its worth, both from the vibrationless operating characteristics, slower engine speed, steam-engine behavior under mountain operating conditions, and a direct drop of 30% in fuel bills throughout the System—enough saving here alone, to save the cost of several buses each year!

The Diesels are run on the tight, carefully serviced schedule up to 150,000 miles, then are completely rebuilt whether they need it or not, to assure perfect operation, on-time at all points and under all operating conditions.

The routes traversed cross the highest highway passes on the Continent, and the climate encountered on a single trip from Chicago to Los Angeles varies from the coldest, through the wettest, to the driest and hottest found anywhere in the world. From mud, snow, rain and low-altitude conditions, through windy, hot, dusty and high-altitude conditions in a single transcontinental run of 2400 miles!

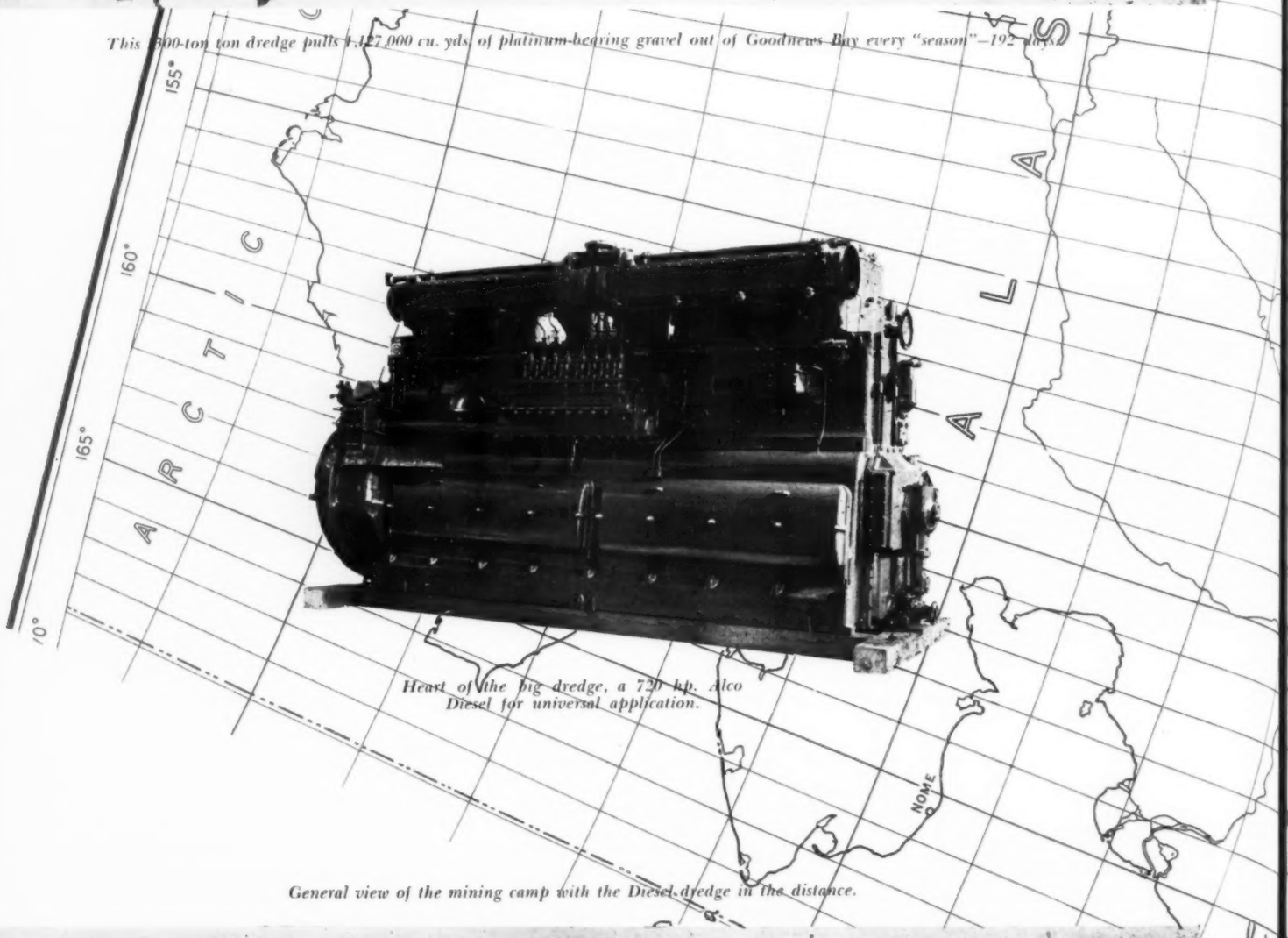
The Diesel operation loses no engine efficiency in any temperature nor at any altitude, and it is safe to say that before many years the entire Burlington Trailways system may be 100% Diesel engined, perhaps the first bus company of its kind anywhere in the world to go 100% Diesel.

Mr. I. B. James, President of the Burlington Transportation Company is frank and very very cheerful in praising the unique campaign of equipment modernization, radical changes in design, installation of Diesels and giving it full credit in a unified, customer-appealing sales campaign for absolutely terminating a long period of financial loss for the company, and turning it into a handsome profit in a short space of 36 months.

He and his co-worker Mr. Ralph Budd, President of the Burlington Railroad system, have perhaps done more to revolutionize the low-cost, luxury-for-the-masses type of transportation than any two transportation executives in history. And the Public has backed these men and their ideas with cash at the ticket window, in a manner never before recorded in this country.

The Burlington Transportation Company, incidentally, also has 5-city type, 38 passenger buses with identical GMC Diesels running between Rockford and Camp Grant, Ill. They are exactly like the Chicago city buses, operated by the Chicago Motor Coach Co.

This 3,000-ton ton dredge pulls 1,427,000 cu. yds. of platinum-bearing gravel out of Goodnews Bay every "season"—192 days.



Heart of the big dredge, a 720 hp. Alco Diesel for universal application.

General view of the mining camp with the Diesel-dredge in the distance.

DREDGING PLATINUM IN GOODNEWS BAY, ALASKA

By WILL H. FULLERTON

A GREAT deal has been said about the woman service Diesels are rendering in out-of-the-way places in this Global War. True, the war has pushed Diesels into almost impossible climes and situations—in greater numbers than ever before—but it is also true that Diesels had already been in most of the "impossible" places on the earth and proved their availability and adaptability under every climatic condition that man could endure.

Here is the story of an Alco Diesel for universal application that has been supplying for several years all of the power for a big Platinum Dredge and mining camp in blizzard-torn arctic-refrigerated Goodnews Bay, Alaska. Platinum, that coveted wedding ring material—but also a vitally important industrial metal has a habit of occurring in the frozen north and if we get it we have to go where it is with equipment that will get it out. This is one case where we went prepared for the worst and the equipment selected proved good.

That dredging platinum ore is an operation of more than ordinary proportions may be visualized from a look at some of the facts.

Think of a dredge hull 130 ft. long, 60 ft. wide, and 9½ ft. deep, weighing some 1300 gross tons; a bucket line of 92 8 cu. ft. buckets, weighing in excess of 100 tons, working at a speed of 28 buckets per minute dumping into the hopper. There are two digging spuds each 26 in. by 48 in. by 60 ft. long, of bolted and welded box steel construction weighing about 30 tons each. That is roughly the massive equipment it takes to carry on the dredging operation and here is what it does.

Dredging goes on at an average depth of 37½ ft., handling an average of 1,127,000 cu. yds. per season, the season being 192 days and the dredge is maintained in operation 90.34 per cent of the time. The buckets dump into the main hopper chute where water under a 90 ft. head directed by two nozzles cleans all sticky material from the inside of the buckets. From the hopper chute the gravel passes through a trommel screen 7 ft. in diameter and 32 ft. long. Divided into five sections this screen grades the material in sizes from ⅜ in. to ⅞ in. in diameter. Thirty-five hundred gpm. of water under a 60 ft. head is directed through numerous nozzles on the gravel in the screen. Approximately 50% of the original material dug passes through the screen into the distributor and thence to the platinum and gold saving tables. From there on the material is riffled and washed, ball-milled and dried then screened and classified—in fact it goes through a maze of operations too complicated to do justice to here, but suddenly presto—platinum—and some gold too, but gold is just a by-product.

It is almost unbelievable that one Diesel—a 720 hp. Alco eight-cylinder, 12½ in. bore by 13 in. stroke driving a Westinghouse 500 kw. alternator at 600 rpm. could keep this "Rube Goldberg" going better than 90% of the time without enforced shutdowns, so costly in such an operation. But it does and has been doing it efficiently for several years. This Diesel shows an overall economy of 0.44196 hp. hr. per pound of fuel; it handles 11.131 cu. yds. of material per gal. of fuel and up through 1942 it had turned out 2,051,361 hp. hrs. In addition to numerous small motors from 2 hp. to 25 hp. there are such formidable loads as the 200 hp. main drive motor, the 100 hp. ladder hoist winch motor, a 50 hp. screen drive motor, a 40 hp. stacker conveyor drive motor and a 30 hp. swing winch motor—all of which are Westinghouse. Then there are three Fairbanks, Morse pumps, two of 3500 gpm. and one of 800 gpm. capacity and a couple of Worthington air compressors.

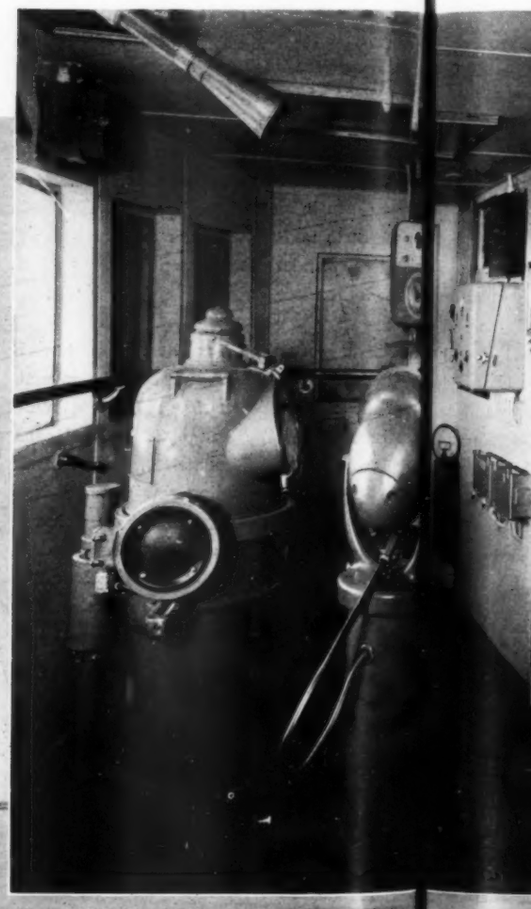
It takes careful planning—husky men and a dependable prime mover to keep this operation going in one of the World's real tough spots—but we must have Platinum for vital industrial uses as well as personal adornment.

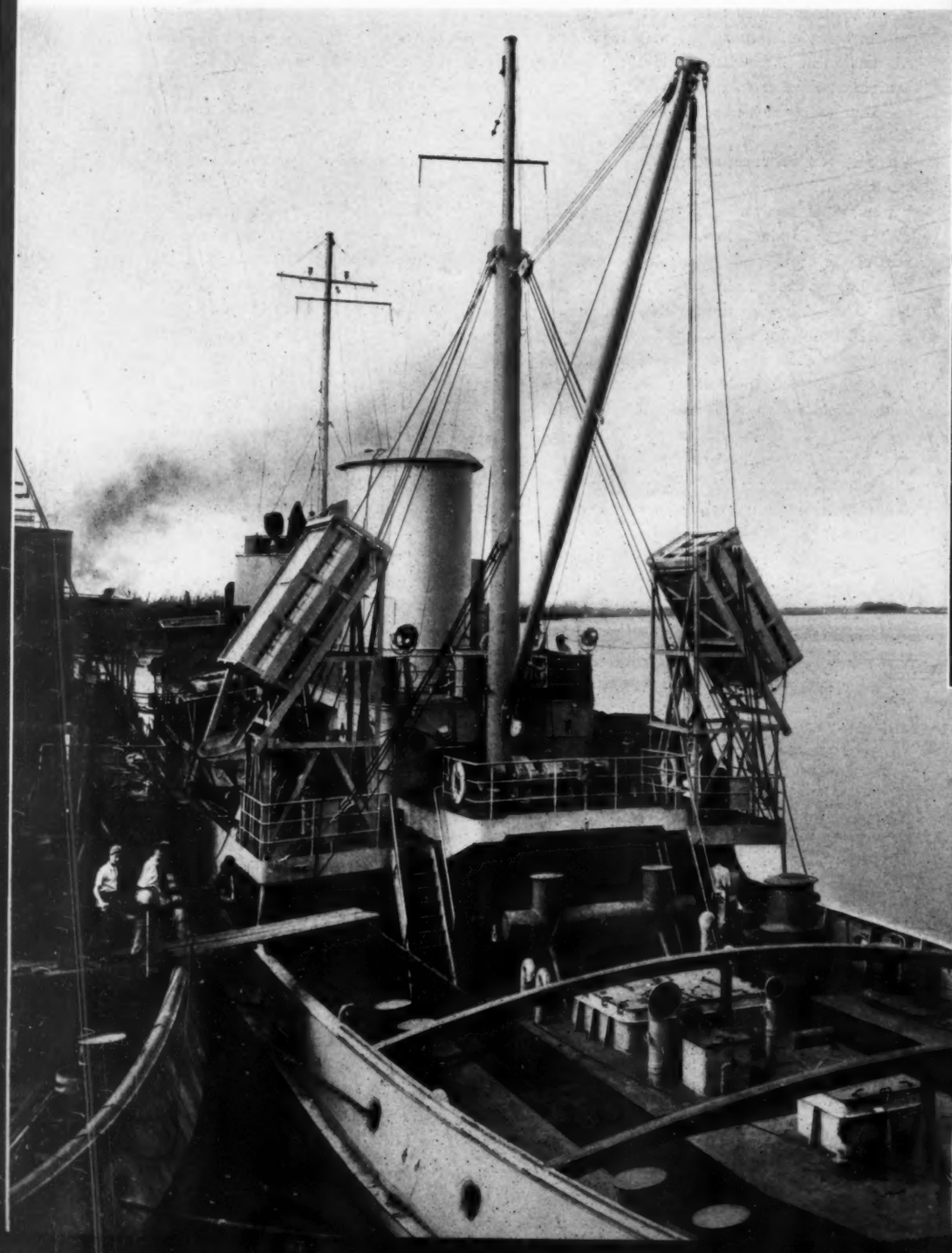
U. S. MARITIME COMMISSION V-4 TUG "SEGUIN"

By WARREN GLEASON

ONCE in a coon's age comes one of those rare vessels which are definitely "Firsts" and this distinction unquestionably belongs to *Seguin*, one of the latest Maritime Commission accomplishments.

Many months ago, the Maritime Commission foresaw the need of ocean-going tugs, vessels which would be able to go anywhere in the world to handle any kind of a towing job, complete the mission and come back home. This broad latitude of distance and performance precluded building to any established designs;



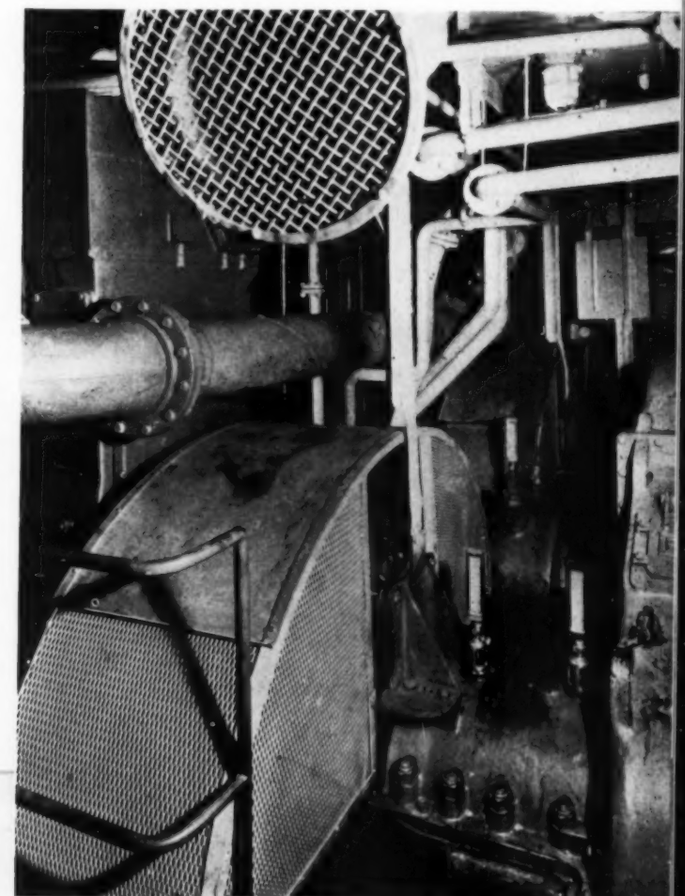


a new measure of requirement enforced new thought in naval architecture. *Seguin* is the answer to the demands of the Maritime Commission for advanced marine design, engineering and construction.

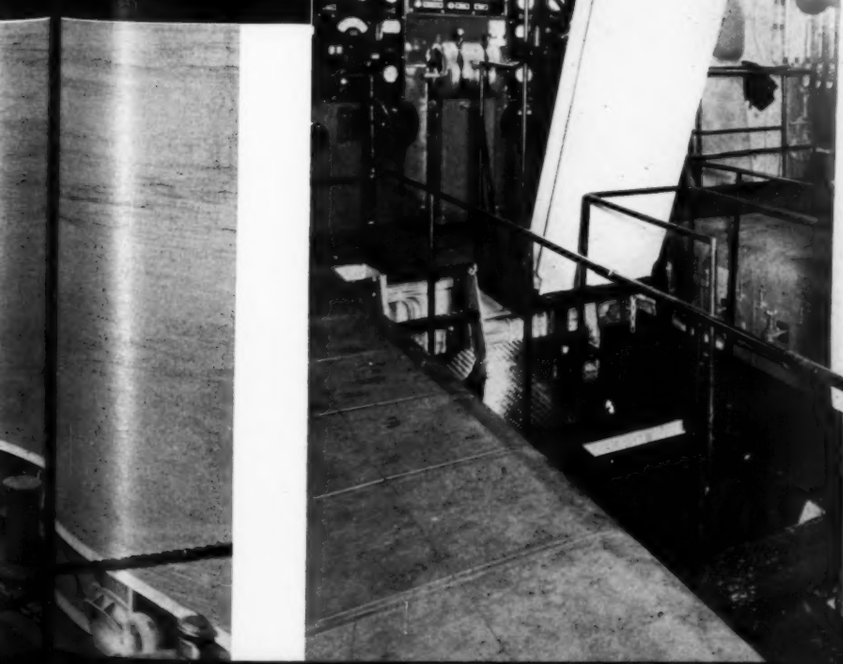
The official designation of *Seguin* is Seagoing Tug, V-4-M-A1. Her dimensions are 194 ft. 9 in. overall length, 185 ft. between perpendiculars. Moulded breadth is 37 ft. 6 in., with 21 ft. 5 in. of moulded depth. Fifty tugs of this design are to be built for the Maritime Commission, and *Seguin* is the first of the class to be completed. More power than specified for the V-4 tugs has been installed in smaller vessels, but this is the first tug ever to be built to such imposing dimensions.

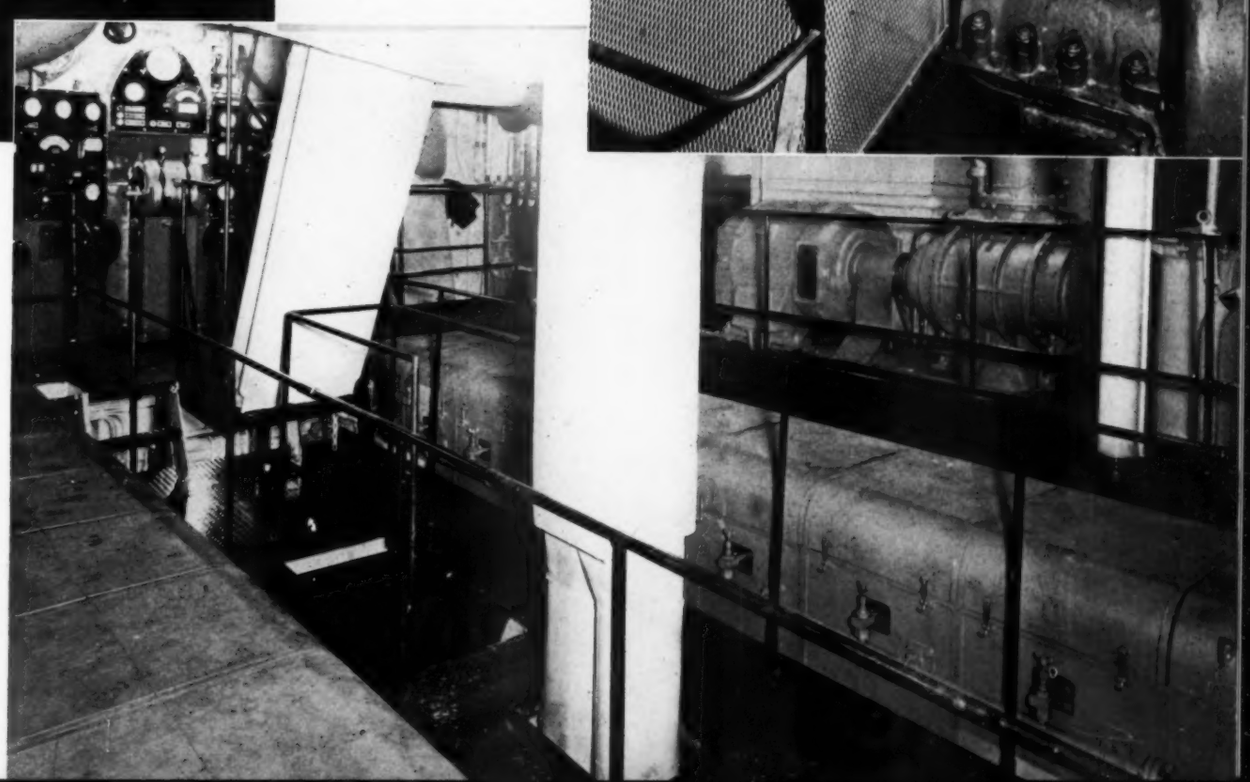
Of contracts for the first 25 tugs of the class awarded to shipyards located in different sections of the country on the basis of ability to complete the undertaking as well as price consideration, an order for four tugs was given to the Avondale Marine Ways, New Orleans, Louisiana. Five different yards got away to the same start. Avondale laid the first keel, on April 27, 1942; held the first launching in August; and on January 9, 1943, *Seguin* went through her first extended trials; the first of the 25 tugs to show what she could do. Her demonstration of smooth speed, powerful performance and pronounced freedom from vibration reflects extreme credit on the skill of the designing staff and the workmanship of the builders.

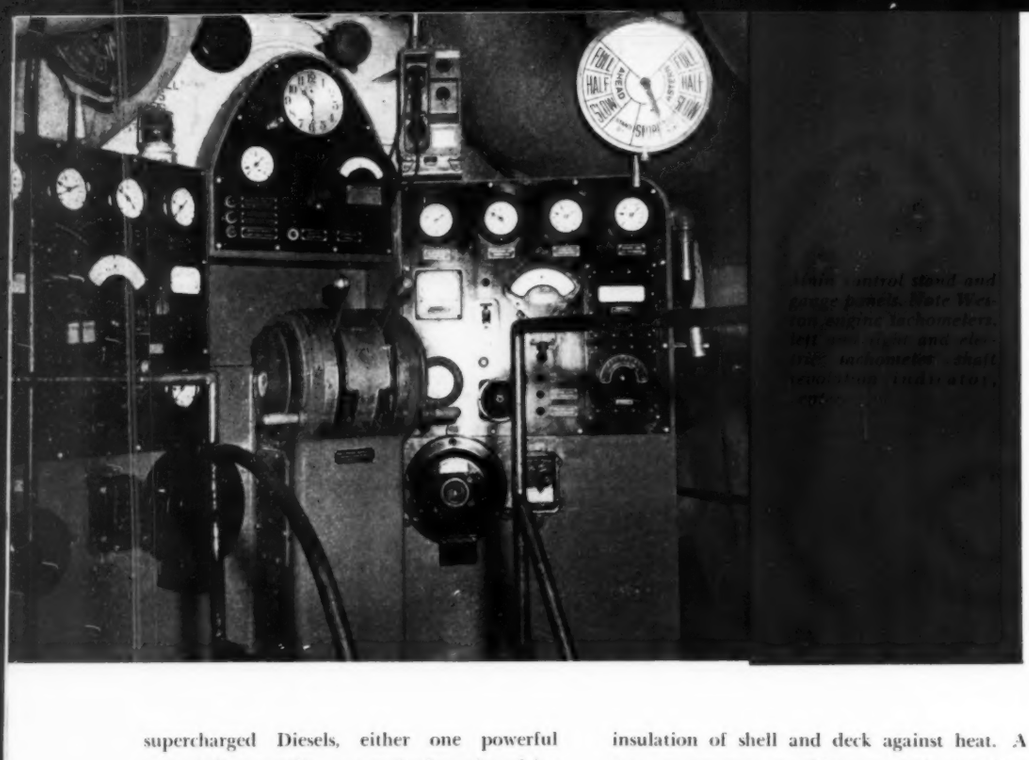
The main power plant consists of a pair of



Lower left: Preparing the "Seguin" for trial runs. Left: Wheelhouse view. Right: View showing Elliott electric slip coupling enclosure and forward end of Farrel-Birmingham reduction gear. Below: Upper engine room view showing tops of the two Superior main Diesels, the engine controls, left and the Roots Connersville supercharging blower, upper right.







supercharged Diesels, either one powerful enough for an ordinary tug. Both engines drive through electric couplings to a common reduction gear and thence to a single propeller shaft; this is the first time that this propulsion system has been applied to a tug. The use of the Kort Nozzle on Government tugs of this calibre is another "first." Smaller engines meant that lessened towing ability must ensue unless a satisfactory improvement in tow-line pull could be secured by some means. Attention was therefore turned to the Kort Nozzle. As this device up to this time had seen little application in government-owned vessels although being used with much success in the commercial field, a thorough testing of V-4 models, nozzle-equipped, was held in the Taylor Basin at Washington, D. C. Here it was conclusively shown that improved towing efficiency is possible by incorporation of the Kort Nozzle.

Another innovation is in the use of the propeller, a design especially developed for this class of tugs. The wheel installed has 4 blades; built by Ferguson, the design was a co-operative effort of engineers of the Maritime Commission and the Dravo Corporation, makers of the Kort Nozzle, and was engineered to take fullest advantage of the water-flow through the nozzle: the pitch is not constant, but varies at different diameters of the wheel. Also new to the tug field is the use of the contra-type rudder, designed by the Goldschmidt Corporation and built by Avondale, the rudder being formed and streamlined for effectiveness in the solid column of water thrown aft by the nozzle-enclosed propeller.

Other innovations include thermostatically-controlled ventilation of all quarters, insulation of the engine-rooms against sound and the insulation of shell and deck against heat. A Sperry gyro-compass, with repeaters in the pilothouse and at two steering stations aft on the upper deck, is not ordinarily encountered on a tugboat. Neither is a well-equipped hospital, like the one located forward on *Seguin*. Every safety device known to the marine field is probably aboard, even including portable radio for lifeboats.

The propulsion engines are twin Superior Diesels, each of 8 cylinders each. The lube oil system includes a filter in each sump, a Nugent pressure filter and a Honan-Crane continuous refiner for each engine. Fuel is filtered by first passing through Cuno metal-edge type filters, thence through DeLuxe filters, using a battery of 4 with a common header. Also protecting the fuel is a Sharpless centrifuge. All Diesels, main and auxiliary, use a common day-tank.

Each main Diesel has two Ross heat exchangers, one for jacket-water and one for lube cooling. There is also a third pair of exchangers—one for lube and one for water—which may be used as stand-by for either engine; the lube heat exchanger in this case being fitted with built-in steam coils for preheating the lube for cold-starting the engines. Another pair of Ross exchangers cools the reduction gear oil; the stand-by here is also fitted with heating coils.

Intake air is filtered and quieted by Burgess snubbers; exhaust snubbers are also Burgess, to which the engines are connected by Penflex tubing.

For supercharging, each Superior uses a Root-Connersville variable speed positive displacement blower, turning up to 1150 rpm. and delivering 3¾ to 4½ lbs. of air to the air manifold, which is reinforced both annularly and longitudinally. The blowers, or superchargers, can be controlled within 60% of the operating range by rheostats on the main control board. Oil-cooled pistons, full pressure lubrication, and chain drives for governors and camshafts are other features of these Diesels.

Each main Diesel is direct-connected to an Elliott magnetic coupling, in turn connected through a Farrel-Birmingham gear, and turning the common propeller at 130 rpm. showing a 2½:1 reduction ratio.

The use of this magnetic coupling offers rare advantages for efficient tugboat maneuvering. The central control stand is fitted with the usual starting and maneuvering lever for each main engine; also, there is another pair of levers controlling the energizing of the couplings. The Diesels may be idled or run at any speed at the dock, with the couplings inactive and without turning the propeller, a feature of much worth for engine tuning or adjustment. Either engine may be cut in or out when under way. For close-quarter maneuvering, docking and the like, one Diesel may be operated at full ahead and the other at full astern, with forward or reverse rotation of the propeller achieved by instantly energizing the corresponding coupling; a far quicker change than could be accomplished by the complete reversing of an engine.

Facing the operator at the control stand is a central board carrying a clock, the reduction gear lube oil pressure gauge and the Electric Tachometer Corporation tachometer for the propeller. A green light shows for "Reduction gear oil pressure normal"; a red one for the same, below normal; a white light shows "Reduction gear oil alarm circuit normal." To the right and left of this board are duplicate boards for each engine. Gauges show lube oil pressure, fuel oil pressure, starting air and blower pressure. Bristol Pyrometer dials are fitted with 9-point selector switches, 1 point for each cylinder and 1 point for an entire engine operation. Each board also has its Weston tachometer gauge and a coupling excitation meter. Red lights glow for faulty lube pressure, jacket water temperature and blower lube pressure. The control stand was engineered and furnished by the National Supply Company, makers of the Superior Diesels.

Operation of this vessel requires more electricity than many a small town, and incidentally there is more machinery aboard than on a Liberty Ship. All pumps and compressors are electrical-

ly driven; there is the load of the gyro-compass, radio, lights, galley equipment and steering mechanism. There is also the automatic electrically operated towing machine, cargo and anchor winches and capstan.

For supplying this current, in a separate engine room forward of the main engines are three Buckeye Diesel generating sets. All sets are mounted on sub-bases resting on Korfund vibration control units. No vibro-isolation is employed with the main Diesels as a flexible base might interfere with the small clearance in the electric couplings. Fuel injection of the Buckeyes, like that of the main engines is Bendix-Scintilla. All three auxiliaries have individual Ross heat exchangers and lube oil coolers, Cuno fuel filters and Honan-Crane refiners.

And there's still another Diesel aboard. In an emergency engine-room on the upper deck is a Reiner Diesel generating set. This Diesel is electrically started; a starting battery is bled off the line from the emergency switchboard and is kept fully charged through high-rate charging equipment. This emergency set is a smooth-running affair, silenced by a Maxim silencer, and functions automatically if the ship's voltage drops below 20% of normal. Also, unique importance attaches to this set, for thereby the whole boat is put into operation.

From a "dead" start, the Reiner set provides enough current to drive the ship's smallest compressor, which furnishes enough air to start the 4-cylinder Buckeye; which then can supply current to a larger compressor for compressing enough air to start one of the main Diesels. Two Ingersoll-Rand compressors are installed, one main and one auxiliary, both of which are powered by Century motors.

An interesting piece of deck equipment is the Almon Johnson towing machine on the after deck. This is a ponderous affair, able to handle 3,000 ft. of 2¼ in. steel cable. This machine if fitted with manually controlled brakes and also with an automatic take-up for continuous maintenance of a taut towline. Anchor windlass and capstans, electric powered, are of Dake manufacture; the windlass is fitted with niggerheads for warping use; 90 fathoms of chain are attached to each 2250 lb. anchor, which suggests the power of the windlass. The Gifford-Wood cargo winch on the "texas" can handle 10 tons on the boom.

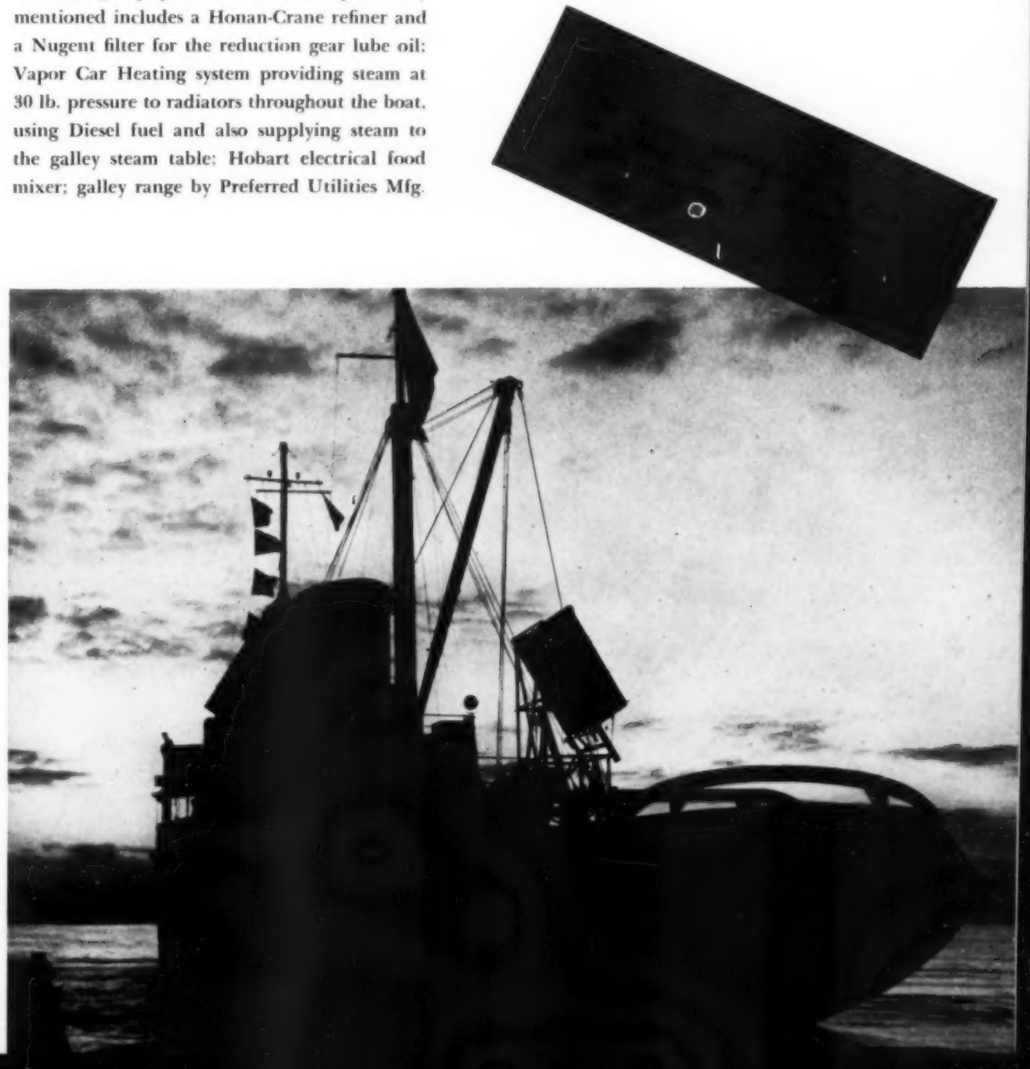
Seguin has had a thorough testing. Her first real trial run was for approximately 50 miles up the Mississippi and took place on a flooded river running thick with driftwood. Ominous critics prophesied jamming the Kort Nozzle full of logs and were greatly surprised when no such untoward results occurred. *Seguin* makes commendable speed; probably another "first" if published figures were advisable; and all drift was carried well away from the aft sections. Even when going full astern and turning, no drift damage was done and it became apparent that the nozzle around the propeller offers great protection instead of unusual opportunity for jamming.

Tests of engine performance were registered with either and both engines running, at all speeds including overload and the power plants gave every promise of thoroughly satisfactory operation. *Seguin* is a remarkable vessel, riding like a liner. When thrown from full ahead to full astern, naturally plenty of vibration could be felt by anyone standing way aft; but under all other conditions the voyaging sensation was quite comparable to a ride in a streamlined train.

She is classed by A. B. S. and B. M. I. N.; she is rat-proofed, with U. S. Public Health approval of fresh water facilities and the International Safety Convention approval for safety at sea.

Interesting equipment other than previously mentioned includes a Honan-Crane refiner and a Nugent filter for the reduction gear lube oil; Vapor Car Heating system providing steam at 30 lb. pressure to radiators throughout the boat, using Diesel fuel and also supplying steam to the galley steam table; Hobart electrical food mixer; galley range by Preferred Utilities Mfg. Corp., Kelvinator box in the galley, with a Carrier system in the main refrigerator plant below decks, consisting of a meat room, fish room, vegetable room, thaw room and an ice-maker, amply providing for the complement. Lane steel lifeboat and motor-driven lap-strake surfboat, both handled by Schat patent davits. Kearfott metal-sash windows are in the pilot house; other features here include the Lionel Corporation compensating binnacle; the Richaudio fire detecting system; Henschel rudder angle indicator; Bludworth Echo Depth Indicator—and here is another "first" as the installation of this device in the pilot-house of *Seguin* marks its first commercial installation; soundings are given in both feet and fathoms. Portlights are Kainer. Uehling "Tank-O-Meters" are installed in the main engine-room for all fuel and lube tanks.

Consensus of opinion has united in giving liberal credit to Avondale Marine Ways for completing an unusual accomplishment in a workmanlike manner. It's an old saying that repeat business tells the story; if that is the case, then it's a good story for the Maritime Commission has just awarded Avondale another contract for four additional tugs of the V-4 class.



MOVING MOUNTAINS THE DIESEL WAY

By JIM MEDFORD

Southern California's moving mountain, El Torro, getting a trimming with a fleet of Diesel Tractors and grading equipment. Each unit averages 1,400 cu. yds. daily on a 300 ft .haul.

J. E. Haddock, Ltd., contractors, operate this Caterpillar Diesel tractor equipped with Trackson Traxcavator on grade separation of Highway 101 and the Santa Fe Railway at Azusa, California.

Sixteen Mack dump trucks powered with 98 hp. Caterpillar Diesels operating three, eight-hour shifts moved 428,000 cu. yds., widening Highway 99 through the Tehachapi Mountains, California.

INGENIOUS METHOD REPAIRS CRACKED BLOCKS AND HEADS

THERE was a time when Diesel maintenance men looked despairingly at a cracked block or head, and consigned it to the scrap heap. But the order of today is repair it. Don't throw away valuable war material that can be kept in service indefinitely.

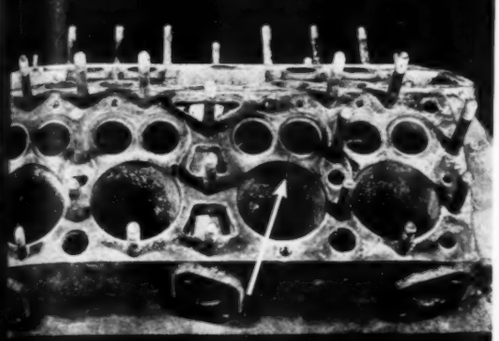
An ingenious method has been developed that restores cracked blocks and heads to service, and keeps them in service for the life of the engine. This process is far past the experimental stage and has been approved and accepted by fleets, Diesel engine manufacturers, our armed forces, and hundreds of experienced automotive and industrial jobbers and repair shops. The method is unconditionally guaranteed if the recommended process is used.

First, the block or head must be cleaned and examined carefully. Most minor cracks can be repaired by the use of a liquid metallic seal. This is applied through the radiator and the engine run until the water reaches at least 200° F. Under the manufacturer's guarantee, if this doesn't effect a complete and satisfactory repair, the purchase price of the seal is applied on the repair of the block or head by the mechanical method, as described here.

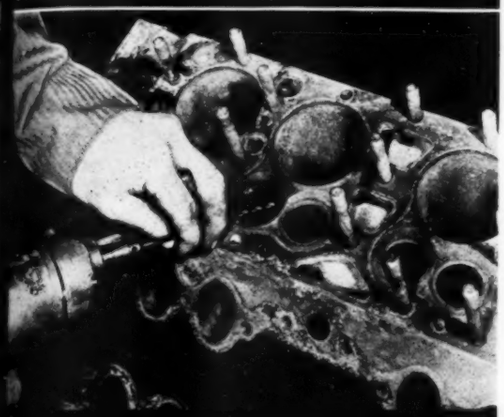
The mechanical method is not to be confused with the old-fashioned lacing procedure. This new patented method is "cold-welding"—actually effecting a union that is as strong as the metal itself, without the use of heat, or brazing of any kind.

Figures 2 to 8 show the elementary steps of an ordinary block repair. The important things to remember are to dip each metal pin into the liquid metallic seal when it is threaded into place, and to use the seal after each mechanical repair is completed.

This mechanical method requires a certain amount of training—and ingenuity—but any good mechanic, familiar with elementary machine tools, can learn in a few hours. The inventors of the process, Kerkling and Company of Bloomington, Indiana, working in conjunction with the Office of Defense Transportation, are now conducting free service schools throughout the country. Mechanics of licensees of this method are trained at the factory service school and also in regional training schools conducted by service engineers from the factory. Kerkling and Company offers a free service manual which explains the detailed method of repairing most common block and head failures.



Cracked Valve Seat in V-8 motor as it appeared before repair.



Next . . . stop crack progression by drilling a hole at lower end of crack in valve port.

With Cape chisel, remove metal between saw marks to form a channel about 1/16" deep—or deeper, depending upon thickness of casting.

As in step No. 2, drill and tap holes, dip pins in K&W Metallic Seal and insert. Cut off surplus, leaving about 3/16" to allow for peening and finishing.

Your repair is now ready for peening. Flatten pins flush with 4 oz. peening hammer.

Finish job by grinding off surplus metal with rotary file—polish smooth with rotary stone.

Trolling
for T.N.T.
Keep America Strong
BUY
MORE BONDS

Uncle Sam's mine sweepers are among the many types of Navy craft powered with GM Diesels. • The long-range dependability and keep-at-it stamina of these engines place them in urgent demand for all kinds of Army, Navy, Coast Guard and commercial vessels.

GM
GENERAL MOTORS
DIESEL POWER

ENGINES . 150 to 2000 H.P. CLEVELAND DIESEL ENGINE DIVISION, Cleveland, Ohio

ENGINES . . . . . 15 to 250 H.P. DETROIT DIESEL ENGINE DIVISION, Detroit, Mich.

LOCOMOTIVES . . . . . ELECTRO-MOTIVE DIVISION, La Grange, Ill.

ERMETO DIESEL INJECTION TUBING CONNECTION

By R. A. LENNOX*

A NEW Diesel injection tubing connection recently introduced by The Weatherhead Company utilizes the efficient Ermeto safety principle. This is the first time a Diesel fitting of this design has been manufactured in the United States.

Details of construction of the Ermeto Diesel injection tube fitting are relatively simple. Research engineers worked from the basic facts—that fuel injection tubing used on Diesel engines is of heavy wall construction, usually from ¼ in. O.D. with a 1/16 in. hole and running in sizes as high as ¾ in. O.D., and that this type of steel tubing must be made with a very accurate and uniform bore, free from radial cracks, dirt and scale. It also must be ductile to permit easy bending and have long fatigue life in service.

Due to the fact that the bore is so small when compared with the O.D. it should be considered as an extremely heavy wall tube, with which it is impossible to use any type of flare fitting. The average compression fitting will not withstand the extreme high pressure and shock load encountered, so it has been necessary when using this type to upset the end of the tube and form a cone-shaped end which would fit into a seat in the nozzle of the injector system. This type of tube assembly must often withstand pressures up to 10,000 pounds per square inch and return to 0 pounds per square inch on each firing stroke of a cylinder of a Diesel engine. The tubing and fitting must not allow any expansion whatsoever. With the accurate means of measuring fuel distribution in modern Diesel injection pumps, the tubing and fittings must also play their part to effectively distribute the fuel to each injector nozzle so that the engines will run smoothly and efficiently.

Figure 1 shows the conventional type of fitting used with an upset tube end. Figure 2 shows the Weatherhead Ermeto Diesel injection tube fitting assembled to tubing and the component parts of the assembly.

With the Ermeto principle, all that is necessary is to cut the tubing square, insert in the fitting, run the nut down finger tight and apply a wrench for approximately two to two-and-a-half turns making a pressure-tight connection. Subsequent disassembly and reassembly requires only a slight wrench pressure to bring the joint tight. This simplification cuts time required for making tubing connections to a fraction of the time previously required and saves labor as well.

The Ermeto fitting is of the non-flaring type, designed to withstand high pressure and extreme vibration. When the nut is tightened, the ring with its cutting edge digs into the outside of the tube and forms a seal, which is pressure tight. The ring is made of heat-treated steel and when assembled takes a permanent set so that it remains permanently assembled to the tube. The pilot on the ring prevents the cutting edge from cutting too deeply into the surface at the tubing. The actual operation performed is shown in Figures 3 and 4 which show the ring before the initial tightening and after seated in place.

With this type of connection, service replacements, particularly out in the field, are quickly and easily accomplished. The multiple operations required for swedging, drilling, and annealing the tube are eliminated. When using Ermeto fittings the problem of stocking tube assemblies for service is eliminated as all that would be required to replace a line would be rings and random lengths of injection tubing.

Figure 5 shows that nozzles and pump connectors can be reseated to accommodate Ermeto sleeves without difficulty. The seating reamer with the aid of a guide recuts the seats quickly and easily without loss of time.

Many Diesel engine manufacturers and injection equipment manufacturers are already using this type of Ermeto fitting with success. The Weatherhead Company is licensed to manufacture Ermeto exclusively in the United States and carries nuts and rings in stock for making connections of the Ermeto type. Both United States and Metric sized threads are made in the popular sizes used by most engine manufacturers. A complete line of Ermeto steel safety tube couplings is also manufactured by Weatherhead.

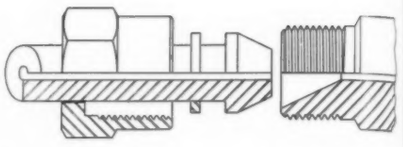


Fig. 1. Conventional fitting used with upset tube end.

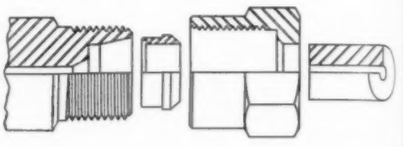


Fig. 2. Component parts of the Ermeto fitting.

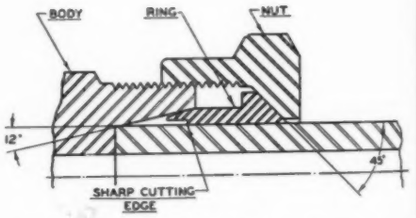


Fig. 3. Assembly of the Ermeto fitting before tightening.

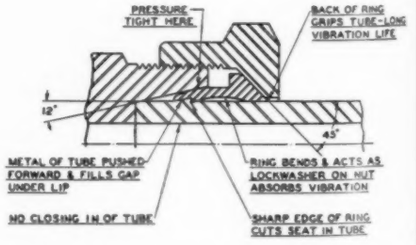

PRESSURE TIGHT HERE
BACK OF RING GRIPS TUBE-LONG VIBRATION LIFE
12°
45°
METAL OF TUBE PUSHED FORWARD & FILLS GAP UNDER LIP
RING BENDS & ACTS AS LOCKWASHER ON NUT ABSORBS VIBRATION
NO CLOSING IN OF TUBE
SHARP EDGE OF RING CUTS SEAT IN TUBE

Fig. 4. After tightening. Note how hardened steel ring cuts into outside surface of tube.

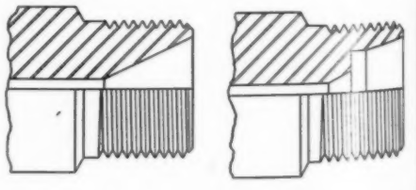


Fig. 5. Left: Conventional upset tube seat. Right: Same fitting remachined for Ermeto fitting.

* Engineer, The Weatherhead Company.

Official U. S. Navy Photograph

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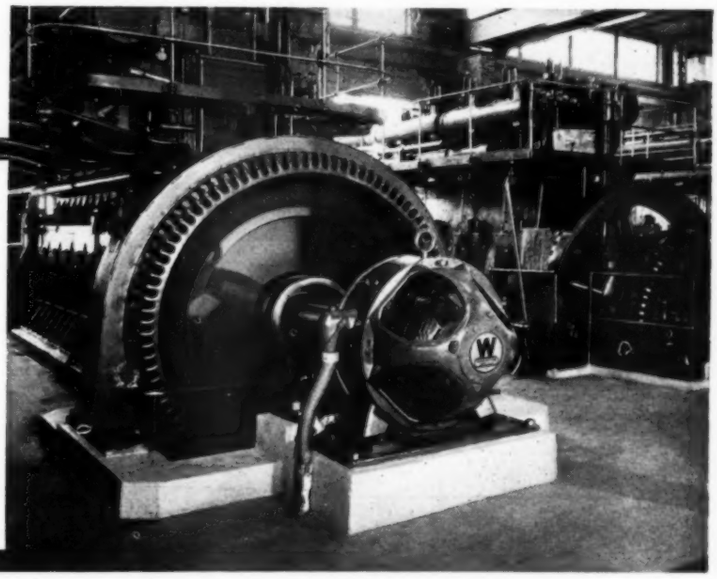

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SCAVENGING PUMPS AND COMPRESSORS

Part 2. Lapping in Valves.

By R. L. GREGORY*

THE proper functioning of the Scavenging Pump and Compressor on an air injection unit depends upon several conditions, but the two most important items are the cleanliness of the parts themselves and the proper care and seating of the valves of the various stages. In order to maintain the proper pressures in the various stages of compression the valves and seats of those stages must be kept in good mechanical condition so as to avoid blowback. This requires that they be properly lapped in at periodical intervals.

Some mechanics work under the erroneous impression, that valves of the type shown in the cuts, can be given the old "lick and a promise" method of lapping in, by merely applying the abrasive or compound to the valve seat, placing the valve in position, giving it a few turns until the valve and seat seem to make a good contact and the job is done. Then they are greatly surprised when the valves fail to function properly and the air leaks by from one stage to another.

A properly lapped in valve requires patience and care in the lapping in operation. They will agree that a fuel pump, fuel check valve or an air governor piston and barrel must have a good lapped fit in order to function properly. So must a compressor valve. The process of lapping in suction and discharge valves is not a difficult one when properly done, nor is it necessary to have a lot of expensive or elaborate equipment to do a good job of lapping in on these valves.

A plant equipped with a lathe can easily make the required jigs for this sort of work. In order to illustrate this the following suggestions and illustrations are offered as one of the simple methods applied in doing a good job of mechanically reconditioning this type of equipment.

The sketch shown in Fig. 1 is descriptive of a low pressure discharge valve which has been removed from service in a three stage compressor, preparatory to reconditioning. In the sketch the writer has purposely exaggerated the rounding condition of the inner and outer valve seats, to better illustrate a condition very frequently found on these seats after long periods of operation. This condition is caused generally, in valves where particles of carbon accumulate, frequently lodging upon the seat and preventing the valve from coming down on the seat squarely. When this condition occurs it doesn't take very many hours of operation before this condition of a rounded edge developes, thus lessening the seating surface and making the valve more susceptible to inefficient operation.

Frequently these valve seats become pitted, due to impurities attacking the valve seat metal, or in some cases due to particles becoming lodged on the seats and the repeated hammering of the valves on the seats pits the seat metal. When this condition exists and is noted, the contact face of the seats should be trued up by placing the seat casting in a lathe and squaring up the face of the seats before trying to lap in the valve. This lessens the time required to lap in the valves, since you have a good square face on the valve seat to start in with. Figure 2 is a sketch of the discharge valve seat only, with the discharge valve spring seat removed. In its place is a jig which is used as a guide to hold the outer ring in alignment while lapping it in. A smaller jig, the diameter of which is represented by the line "Y" is used in lapping in the inner ring.

Note that the rounding edge of the valve seats represented by the letter "A", in Figure 1 has been removed in a lathe, the surface of the valve seat being square as represented by the letter "B" in Figure 2. With a good grade of fine abrasive compound, placed at intervals along the valve seat, the jig in place and then the valve placed over it, it is an easy matter to then lap in the valve, by merely using the tips of the fingers to turn the valve on the seat.

During the process of lapping in the valve, it should be inspected several times to see that the abrasive is doing the proper job at all points, and that there are no high or low spots on the valves. Valves can be lapped in several times, providing they do not warp or become wavy, which often results from the heat to which they are subjected.

Upon completion of the lapping in, the whole valve can be reassembled, being sure that all abrasive is removed prior to reassembly. In the

. . . . *And now please turn to page 58* . . . .

* *Chief Engineer, Municipal Water and Light Plant, Hillsdale, Michigan.*

Fig. 1

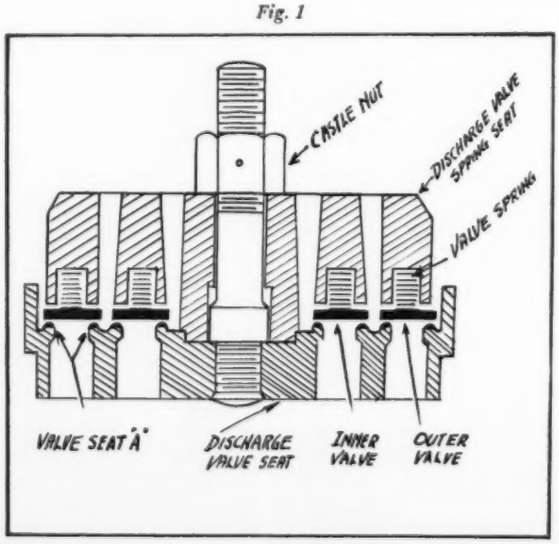
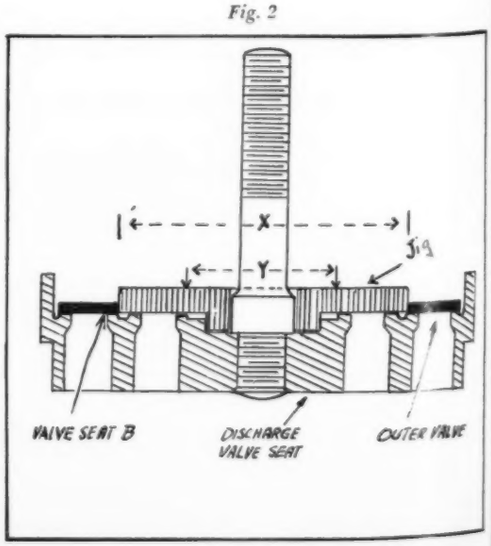


Fig. 2



This is the reason they called the tube KLYSTRON*

Does it seem far-fetched to you?

Can there be any possible similarity between an ocean wave and an ultra-high frequency tube?

As a matter of fact, there's a very definite similarity.

A breaking wave is the best way we know to picture what happens to electrons in the KLYSTRON tube invented by the Varian brothers—Russell and Sigurd—and Dr. William W. Hansen.

Inside this tube, the inventors were able to direct a stream of electrons which concentrated their power and released it much as waves do when they mount into crests and crash on the shore.

That's why the tube is called KLYSTRON. The name comes from a Greek word that denotes the breaking of waves on a beach.

Initial research on the KLYSTRON was done in California at Stanford University. The Sperry Gyroscope Company was quick to see the tube's possibilities. So they helped the inventors carry on further development of the KLYSTRON as a valuable tool of war and aeronautics.

When the tube got beyond the early experimental stages, the Varian brothers and Dr. Hansen joined Sperry's staff of inventors, engineers, and research men.

With the close co-operation of the Army and Navy, the development and perfection of the KLYSTRON continued, and is still continuing.

Applications of the KLYSTRON include the generation, amplification, and reception of ultra-high frequency waves. Naturally, they are being devoted exclusively to war uses at present.

When the war is won, Sperry research will explore the fascinating field of KLYSTRONICS** in relation to the comfort and security of a world at peace.

SPERRY

GYROSCOPE COMPANY, INC.

BROOKLYN, N. Y.

Division of the Sperry Corporation

*KLYSTRON is a registered trademark of the Sperry Gyroscope Company—Registration No. 371650.

**Trademark

Exchange Your Diesel Maintenance Ideas

Conducted by R. L. GREGORY

Editor's Note: In this department we provide a meeting place where Diesel and Gas engine operators may exchange mutually helpful maintenance experiences to keep our engines in top condition. Mr. Gregory edits your material and adds constructive suggestions from his own wide experience. This is your department—mail your contributions direct to DIESEL PROGRESS.

Maintenance of Starting and Blast Air Bottles and Receivers

ONE of the important features in the maintenance of air injection units and units using compressed air for starting purposes is to keep the bottles clean and free from sludge and emulsions. This is just as important as keeping cooling systems free from rust and foreign matter.

In the process of compressing air, considerable moisture develops which has a tendency to collect in these reservoirs. This moisture mixing with oil, forms a greenish emulsion, which is very adhesive to piping, fittings and also to the sides and bottoms of these bottles or reservoirs, and if this emulsion is not removed periodically, an injurious accumulation may result.

While all such reservoirs or bottles are equipped with bleedoff lines, which are opened for the purpose of blowing down the bottles, at periodical intervals, do not put too much dependency upon them doing a thorough job, because of the adhesive nature of this emulsion it is practically impossible to get it all by merely blowing down the reservoirs.

In order to make sure that your reservoirs or bottles are kept in good operating shape, periodical dismantling of this equipment should be practiced, for the purpose of flushing out all foreign material which blowing down does not remove. All piping, valves and fittings leading to and away from these reservoirs should be removed and cleaned out. By use of hot water, steam or some other good grease cutting agent, both the bottles and piping can be thoroughly flushed after which they should be wiped out with clean rags. Do not use wiping waste.

Upon completion of this flushing and cleaning process, you may reassemble the reservoirs with their respective fittings, being sure to use some good compound in making up the joints. Another item of importance in this work is to inspect all valves making sure that they are air tight and that the packing on the valve stems is in good shape. Never take the matter of valve condition for granted.

Most of these valves are either of the plug type or are needle valves, either of which can be ground in to form a perfect seat. If a valve of this type is neglected and not kept in good mechanical condition, there is a likelihood that the valve may seize, so to speak, and when urgently needed may not close off tight or you may be unable to open it. Instances of this kind do occur quite frequently in neglected valves.

Another item which is all important and which has been discussed in former articles to some extent, is the condition of the safety or relief valves. This emulsion gets in on the seats of these valves and often has a tendency to solidify due to heat. Cases of this kind have caused failure in the proper operation of the relief valves resulting in the bursting of seams or heads of receivers. Too much stress cannot be placed upon this point.

In many installations, the gauge lines are taken directly off the blast bottles to show blast pressure or off the starting bottles to show the starting air pressures. In such cases the lines from the bottles to the gauges become clogged with this moisture or emulsion, resulting in faulty gauge readings, which are not conducive to good operation. When cleaning these reservoirs or bottles it is good practice to remove these lines and ascertain whether they are free from sludge. At the same time it is well to check your various gauges supplied by these lines, to see that they are functioning at the proper ranges, before reassembling.

In connection with gauges, much depends upon the proper operation of all gauges connected with the unit. Therefore it is good practice to have a duplicate set on hand, so that any defective gauge may be replaced, while being repaired. This applies to pressure gauges, vacuum gauges and temperature gauges, all of which should be in first class operating condition at all times, in order to eliminate any guess work in the matter of operation.

Victory Maintenance Plan Prepared for Diesel Electric Plants

TO keep essential power-generating plants operating at maximum output, the "Victory Maintenance Plan for Diesel Electric Plants" has been developed through the cooperative effort of the Diesel engine manufacturers and the Westinghouse Electric and Manufacturing Company.

As a contribution to better and more adequate maintenance programs for Diesel engines and generators, Westinghouse consulted engine builders for assistance in the preparation of this information so that a combined plan for the units could be established.

Prepared as a portfolio, this plan includes an 18-page Operating Guide booklet that covers complete information on the necessary steps for maintenance and inspection programs. Mechanical and Electrical Check Charts based on frequency of Inspection and a sample form of a recommended Diesel Engine Operating Log

The "Victory Maintenance Plan for Diesel Electric Plans," copies of which can be obtained from Diesel engine builders, is discussed by the Westinghouse men who assisted in its preparation. They are, left to right, L. F. A. Mitchell, Manager Machinery Electrification Section Industrial Dept., N. H. Gimmy, Application Data Dept., E. E. Lacey, Machinery Electrification Section and K. M. Patterson, Application Engineer, Transportation and Generator Division.

WHAT!

FLUID DRIVE A PC BOAT?

One of the U. S. Navy's new fluid drive equipped PC boats seeks out enemy subs.

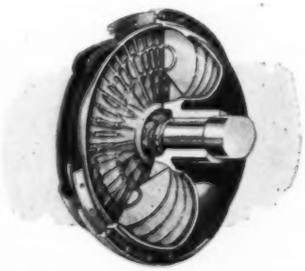
SOMEWHERE AT SEA this minute — now, U. S. Navy PC boats are relentlessly hunting down enemy subs.

Laden with depth charges and carrying an additional armament of torpedoes and anti-aircraft guns and cannon, they knife swiftly, silently through dangerous waters.

American Blower Fluid Drives on these new PC boats (as well as on many other types of Navy craft) prevent transmission of torsional vibrations and shock from powerful Diesels to delicate machinery, synchronize multiple engine speeds and permit rapid clutching and declutching.

Building equipment to Fluid Drive warships, submarines and cargo vessels is among the important assignments for *victory* entrusted to American Blower.

After Victory the engineering skill and experience and American Blower's complete facilities for manufacturing, fabricating, welding, processing and assembling will be available to produce for you Fluid Drives, air handling equipment of all types and other ingenious products which will play a vital role in post-war world progress.



Cutaway view of American Blower Fluid Drive. There is no mechanical connection between driving and driven members.

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For excellence in production.

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CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

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"ALNOR"

The Rensselaer municipal power plant described in this issue has established a record for lowest consumers' rates in Indiana; moreover the City's lights have never been darkened by a Diesel engine failure. Such records are made by engines of good design and manufacture operating continuously at peak efficiency. That is what "Alnor" helps good Diesels to do and that is why the majority of modern Diesel installations are "Alnor" protected.

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Illinois Testing Laboratories Inc.
423 NORTH LaSALLE STREET, CHICAGO, ILLINOIS
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. . . . *Continued from page 54* . . . .

process of reassembly, the valve springs should be inspected to be sure that there is the proper tension left in the springs. If a weak spring is found, it should be replaced by a new one. If a warped valve is found it should be immediately discarded for a new one, the new one also being lapped in to the valve seat before being assembled. After reassembly has been completed, be sure to try the travel of the valve above the seat, to ascertain that it is free and has the proper clearance, which in most cases should be approximately 1/8".

This is just one of many methods which are applicable to lapping in of these valves, and this method can be applied to the valves in all stages, both suction and discharge. The only difference being in the shape of the jig used. In making these jigs, be sure to have the fits close, with just enough tolerance to allow for free turning of the valves on the seats during the process of lapping in.

If any of our readers have other methods of doing this work, we would be glad to have them advise us, as perhaps some engineers may find that they can accomplish this work in other manners more to their liking. The simplicity of the equipment used in this method makes it applicable to most cases and hence is given on that basis.

New "Alnor" Bulletin

ILLINOIS Testing Laboratories, Inc., announces a new Bulletin No. 2819 covering its line of "Alnor" Pyrometers, Electrical Resistance Thermometers, Velometers and Pyrometer Controllers. The bulletin carries descriptions of the full line of "Alnor" instruments with a large number of typical applications illustrated and explains the value of pyrometer detection of engine overload, scale formation in water jackets, faulty combustion, fuel injection and valve setting irregularities, all conditions which result in abnormal exhaust temperatures. A free copy of this informative bulletin will be mailed upon request to Illinois Testing Laboratories, Inc., 420 North La Salle Street, Chicago 10, Illinois.

Ora James Mulford

GRAY Marine Motor Company announces the death of its president Ora James Mulford on August 3rd, at Detroit, Michigan.

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ARMY E NAVY
FOR EXCELLENCE

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EMERGENCY fire control is only one of the many important jobs which the Navy entrusts to the dependable power of Diesel auxiliary engines; jobs in which failure might mean the loss of a ship—the loss of a battle.

As a part of Diesel-powered water pumpers, generators, and other aboard-ship auxiliaries—Ex-Cell-O fuel injection equipment is really playing an essential part in the success of Diesel power at war.

A feature of the Ex-Cell-O Type KB Fuel Injection Pump is automatic timing. It provides for maximum power output and minimum fuel consumption at all speeds by advancing injection according to engine rpm. Illustrated at right above, is Ex-Cell-O Type KD Pump for either constant or variable speed application where automatic timing advance is not required.

Ex-Cell-O precision nozzles, available to Diesel engine builders for original equipment and replacement, combine simplicity with freedom from leakage and stickage, and protection for working parts. There are designs for various types of aircraft, automotive, marine, and stationary Diesel engines.

XLO

For complete details of Ex-Cell-O Fuel Injection Pumps and Nozzles, Diesel engine builders should write to Diesel Division of Ex-Cell-O Corporation, 1200 Oakman Boulevard, Detroit, Michigan.

EX-CELL-O

FUEL INJECTION EQUIPMENT

Fairbanks, Morse Announces A New Bulletin

FAIRBANKS, Morse & Co. has just made available its new Bulletin 3000A titled FAIRBANKS-MORSE DIESELS FOR PROFITABLE POWER. This booklet, illustrated in two colors, gives a brief history of the company's background followed by a representation of design, manufacture and service facilities back of the entire line of Fairbanks-Morse Marine and stationary Diesels. A loose leaf supplement sheet furnished with this new bulletin carries a long list of Fairbanks-Morse Diesel engine installations with essential operating figures on each plant. A free copy of this interesting and attractive Bulletin No. 3000A will be mailed to those requesting it on their company letterhead. Write direct to Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago 5, Illinois.

Diesel-Electric Locomotives Eliminate Smoke Nuisance in Steel Mill

TWENTY-THREE locomotives are now being manufactured by H. K. Porter Company, Inc., for Carnegie Illinois Steel Corp., 12 of them to meet the pressing demand for more locomotive power at the Homestead, Pa., Works.

Six Diesel electrics and six steam locomotives, in the 60 and 35 ton classes, are comprised in the group being made for Homestead, according to a company announcement. They will be employed in hauling scrap to charge the open hearths, and transporting ingots from the open hearths to rolling mills and preheating furnaces.

The Diesels will represent the first employed at Homestead, where they are particularly desired to eliminate smoke and steam inside the buildings.

Michiana Products Corp. Appointments

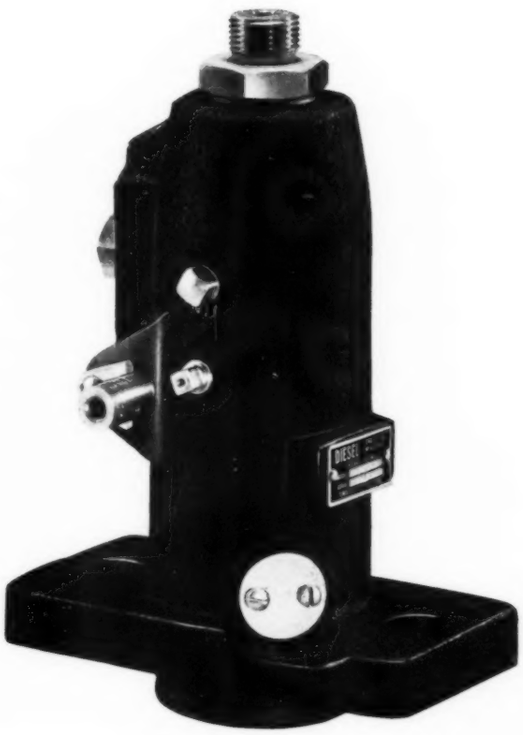
MICHIANA Products Corporation of Michigan City, Indiana, makers of heat and corrosion-resistant alloy castings, oil filters and other sheet steel products, announce the addition of Messrs. Dougherty and Staiger to their staff.

Mr. E. R. Dougherty, formerly General Sales Manager of the Chicago Steel Foundry, has been engaged for sales work in both the Alloy and Sheet Metal Divisions.

Mr. John H. Staiger has joined the metallurgical staff. Since graduating from Purdue University in 1936, Mr. Staiger has been engaged in metallurgical engineering work and was until recently Metallurgical Engineer with LaSalle Steel Co. of Hammond, Indiana.

Demco

"PF" FUEL INJECTION PUMPS



are INTERCHANGEABLE *and* AVAILABLE!

While overall and mounting dimensions of Demco "PF" Fuel Injection Pumps have been kept such as to permit interchangeability with other makes—*Demco has provided increased capacity through the use of larger plungers.* Demco "PF" Fuel Injection Pumps are of the port controlled type—the quantity of fuel injected per stroke being governed by a metering helix on the plunger.

Demco Pump designs permits the latest finishing methods for friction surfaces—insuring long, trouble-free service.

The Demco line of flange mounted, Fuel Injection Pumps conform to the latest engineering practices and have been proved to equal the most exacting requirements.

Look to Demco for progressive fuel injection equipment.

DEMCO

DIESEL ENGINEERING & MANUFACTURING CORP.

200-214 NORTH LAFLIN STREET • CHICAGO, ILLINOIS

Propeller Club Convention Set for October 14th & 15th

THE 1943 convention of the Propeller Club of the United States will be held October 14th and 15th at the Waldorf Astoria Hotel in New York is announced by Arthur M. Tode, honorary president. Also meeting in conjunction with the Propeller Club convention will be the American Merchant Marine Conference, presided over by Rear Admiral Howard L. Vickery. Guest speaker at the convention will be Rear Admiral Emory S. Land, chairman of the United States Maritime Commission.

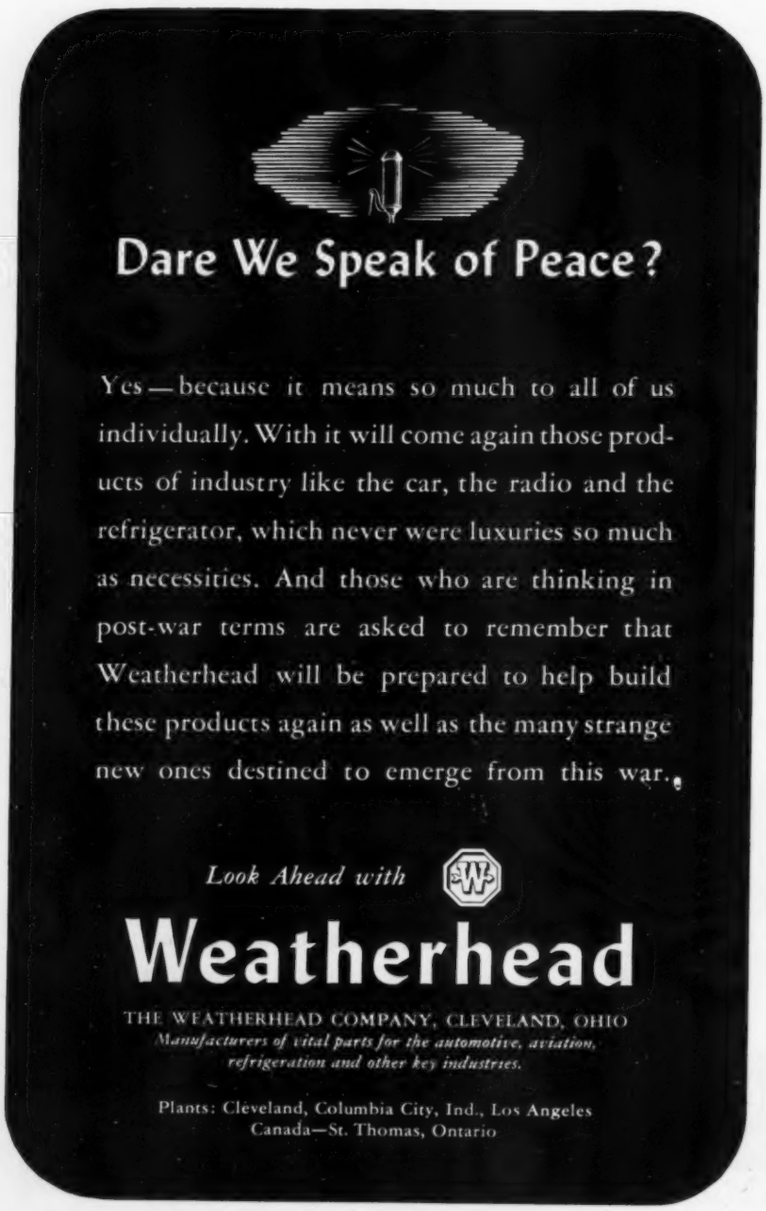
Name C. T. Ruhf President of Mack Trucks, Inc.

ANNOUNCEMENT of the election of C. T. Ruhf as president of Mack Trucks, Inc., has been made by Louis G. Bissell, chairman of the board, at a regular meeting of the board of directors. He has been with Mack since 1912. Mr. Ruhf had been executive vice president of

C. T. Ruhf newly elected president of Mack Trucks, Inc.

Mack since last January, following the death of E. C. Fink former president and board chairman. Prior to that time he had been operating vice president in charge of factories.

In 1920 Mr. Ruhf was appointed assistant to the factory manager of the Allentown plant, in which position he served until appointed factory manager in 1937. In 1938 he was made operating vice president in charge of production at the company's plants in Allentown, Pa., Plainfield, N. J. and New Brunswick, N. J. In this capacity he supervised the building of the heavy-duty motor trucks and prime movers Mack is now supplying the armed forces and also the huge Mack-built transmissions used in many of the Army's 30-ton tanks.


Dare We Speak of Peace?
Yes—because it means so much to all of us individually. With it will come again those products of industry like the car, the radio and the refrigerator, which never were luxuries so much as necessities. And those who are thinking in post-war terms are asked to remember that Weatherhead will be prepared to help build these products again as well as the many strange new ones destined to emerge from this war.
Look Ahead with
Weatherhead
THE WEATHERHEAD COMPANY, CLEVELAND, OHIO
Manufacturers of vital parts for the automotive, aviation, refrigeration and other key industries.
Plants: Cleveland, Columbia City, Ind., Los Angeles
Canada—St. Thomas, Ontario

Penn Electric Switch Co. Receives Second "E" Award

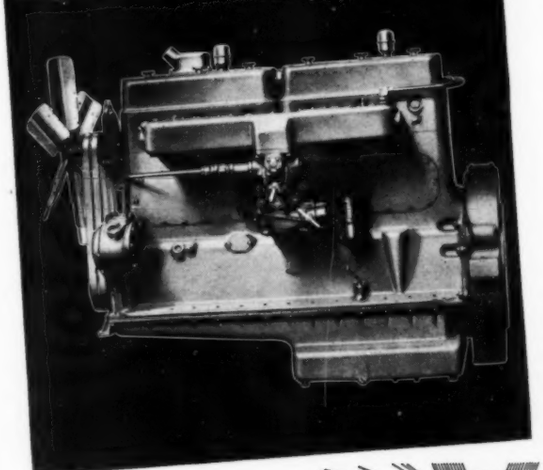
EMPLOYEES and officials of Penn Electric Switch Co., Goshen, Indiana, were again honored by the Army-Navy Production Board by the renewal of their Army-Navy "E" Award. This second coveted award is in the form of a white service star affixed to the "E" flag and signifies continued excellence in the production of war material.

In a letter to the company, C. C. Bloch, Admiral, U.S.N. (Ret.), Chairman, Navy Board for Production Awards, stated: "The men and women of the Penn Electric Switch Co. have achieved a signal honor by continuing their splendid production in such volume as to justify this renewal to their award. In the first instance it was difficult to win the Army-Navy 'E' and by meriting a renewal, the management and employees have indicated their solid determination

CRITICAL MATERIAL.... by the payload!

Iron ore is hauled right from the mine by Walter Tractor Trucks, with 35-ton side dump ore trailers, powered with 300-hp. Model 6-WAK Waukesha Engines, 6½" bore x 6¼" stroke, 1197 cu. in. displacement.

WAUKESHA ENGINES.....give Walter Ore Tractors extra power



● Snyder Mining Company, Chisholm, Minn., has an off-the-highway hauling job that's tough—hauling iron ore right out of the mine.

Walter Tractors are doing it . . . and doing it well. All four of these new ones have Waukesha Engines.

These big, butane-burning Model 6-WAK Waukesha Engines are designed and engineered to deliver greater power per cubic inch displacement. Or, as the mining company's truck drivers call it—"plenty of power and lots of zip" according to Mr. Tancig, general mechanical superintendent, who also says, "the truck drivers like to drive these large units." *Get Bulletin 1138.*

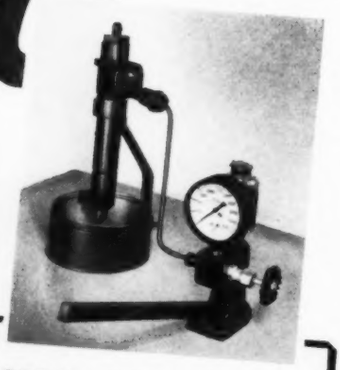
WAUKESHA MOTOR COMPANY, WAUKESHA, WIS.
NEW YORK • TULSA • LOS ANGELES

MORE POWER FOR VICTORY

WAUKESHA ENGINES

ADECO

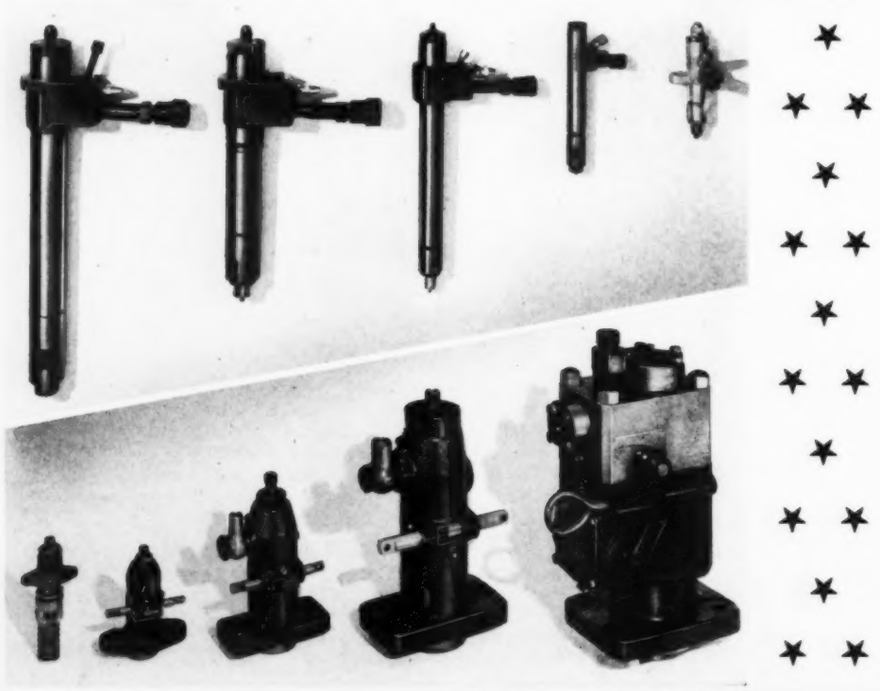
DEPENDABLE
DIESEL FUEL
INJECTION EQUIPMENT



ADECO NOZZLE TESTER
For Economical Maintenance

America's most widely used Nozzle Tester enables any mechanic to make quick, accurate tests on injector opening pressure, spray pattern, etc., and detect stuck needle valves and leakage around valve seats. Compact, portable, sturdy, precision-built. Pressures up to 10,000 p.s.i. Tests both large and small injectors. Avoids costly delays and possible damage to engine. Best for economical maintenance. Write for new illustrated bulletin.

Throughout the diesel industry, Adeco stands for the finest in fuel injection equipment. Years of experience in pioneering equipment for America's diesel needs have resulted in an outstanding line of fuel injection pumps, nozzles and nozzle holders. Today's performance of this dependable equipment merits your confidence for tomorrow's requirements.



AIRCRAFT & DIESEL EQUIPMENT CORPORATION
4401 North Ravenswood Avenue • • • • Chicago, Illinois

and ability to support our fighting forces by supplying the equipment which is necessary for ultimate victory."

A large part of Penn's production output is the manufacture of complete electrical control circuits for naval guns. These units include the necessary switches, solenoids, transformers, lights, firing triggers, etc., necessary to the operation and firing of the 3" and 5" guns used by naval vessels as well as cargo ships. Penn also manufactures special solenoids for firing aircraft guns mounted on Navy fighter planes. The company builds periscopes used in Army tanks to enable tank personnel to see out of the tank without being subjected to direct gunfire through openings in the armor.

In addition, approximately 85% of the company's peacetime automatic controls have also gone to war. These include controls for heating, refrigeration, pump and air compressor applications as well as safety controls for internal combustion engines.

Timely Edition of the Diesel Engine Catalog Now Being Distributed

THE Eighth edition of the DIESEL ENGINE CATALOG touches a new high in reflection of the tremendous strides being made by the Diesel Industry. This 408-page book, the work of Rex W. Wadman, typifies his keen perception—gained through 25 years' association with the Diesel Industry as Editor and Publisher, of present-day needs for complete, reliable and easy-to-read Diesel information. Volume eight of the DIESEL ENGINE CATALOG breaks all precedent in its size and completeness, carrying as it does—the descriptions of all the Diesel engines marketed in this country — profusely illustrated in colors, also a convenient directory of engine and equipment manufacturers and a large and informative advertising section. The book, now being distributed, is in unusual demand—serving as it does the needs of all interested in the design, construction and operation of Diesel engines. Use the convenient coupon to be found on page 74 in this issue in ordering your copy.

Army-Navy "E" To Detroit Gasket & Mfg. Company

THE coveted Army-Navy "E" was recently awarded to Detroit Gasket & Mfg. Company for excellence in war production. A large number of concerns associated with the Diesel industry have won this recognition of outstanding performance in meeting the demands of our war effort and Detroit Gasket & Mfg. Co. announces, with pride, the addition of its name to the roster of those so honored.

THEIR TELEPHONE...

HAS BEEN *DISCONNECTED!*

Undoubtedy you have had just such an experience when you were in a jamb with an important piece of equipment. It is usually the result of having bought from a firm whose representatives are here today—and gone tomorrow.

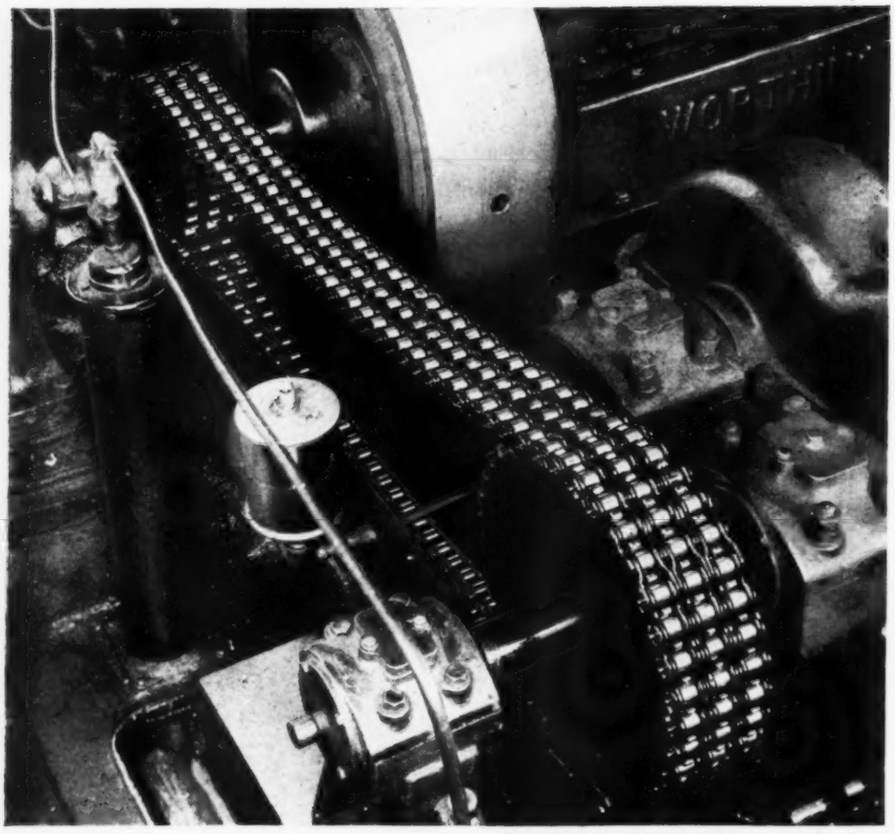
When you buy a piece of equipment—one which affects your earnings—one which may require servicing—it is well to know who is back of the man from whom you buy.

When you buy an Atlas Diesel, you'll find that back of the salesmen are two modern factories—one in the East and one in the West. In the major ports you will find Atlas Factory Branches, equipped with machine shops and staffed with mechanics who know how to make an Atlas Diesel sing.

ATLAS IMPERIAL DIESEL ENGINE CO.

OAKLAND · CALIFORNIA

NORTHWESTERN DIVISION . . . . . 69 COLUMBIA STREET, SEATTLE, WASH.
EASTERN DIVISION . . . . . 115 BROAD STREET, NEW YORK, N.Y.
CENTRAL DIVISION . . . . . 228 NORTH LA SALLE STREET, CHICAGO, ILL.
SOUTHWESTERN DIVISION . . 5726 NAVIGATION BOULEVARD, HOUSTON, TEX.



Diamond Roller Chain (triple No. 470) drive from Worthington gas engine to Roots positive rotary blower supercharging old engine.

HELPING INCREASE HORSEPOWER OUTPUT

Diamond Drive for Supercharger Blower

● To gain the full advantage of boosting horsepower output in an easte n electric plant, positive Diamond Roller Chain was selected to drive the supercharging Roots rotary blower from the Worthington gas engine.

Diamond Roller Chains have unusual capacity for size—save space, operate smoothly with no more attention than routine oiling. They perform equally well on long or short centers, and because they are not dependent on friction, they put a minimum of strain on bearings and shafts.

Available in pitch sizes up to 2½ inch, in single and multiple widths, Diamond Chains are used as timing and accessory drives on leading makes of gas and diesel engines and as shaft generator and take-off drives in capacities up to 1500 h.p. . . . For power transfer of any kind, you can be sure of long life, low maintenance and high efficiency with Diamond Drives . . . DIAMOND CHAIN & MFG. CO., 407 Kentucky Avenue, Indianapolis, Ind. Offices and Distributors in All Principal Cities.

DIAMOND ROLLER CHAINS

Adin L. Davis Appointed Advertising Manager for Worthington

WORTHINGTON Pump and Machinery Corporation announces that its advertising department is now located at 744 Broad Street, Newark 2, New Jersey. Contact by telephone can be made by calling Mitchell 2-0125.

Mr. Adin L. Davis, recently appointed advertising manager, heads the department and will direct all advertising, sales promotion and publicity activities for the corporation.

Purolator Products Names Kelly Assistant Sales Manager

JOHN M. CLARKE, vice president, Purolator Products, Inc., Newark, N. J., announces the appointment of Fulton S. Kelly to be assistant sales manager of the company.

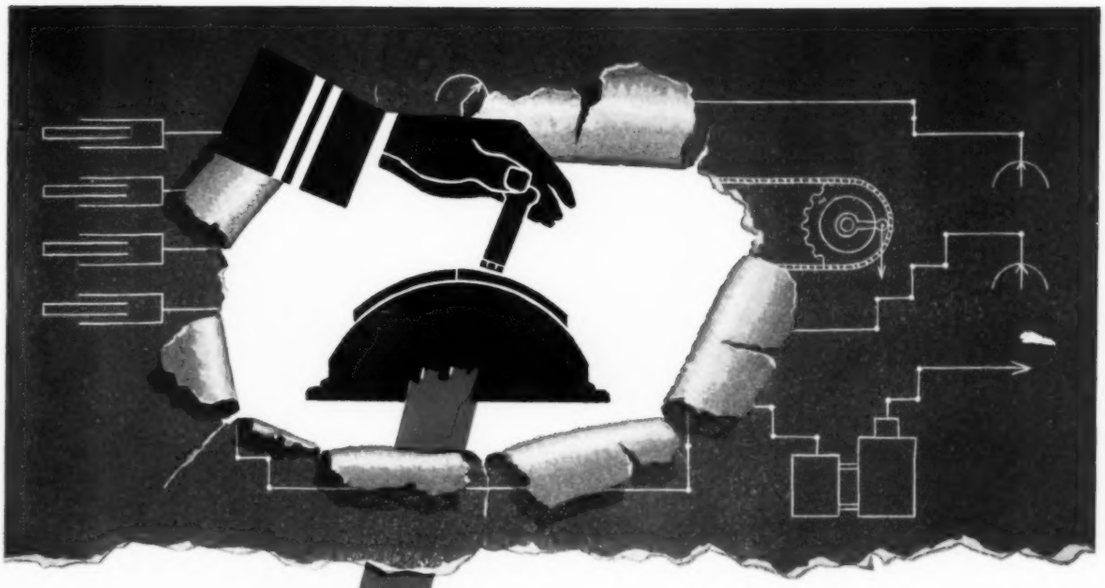
Fulton S. Kelly, Assistant Sales Manager, Purolator Products, Inc.

Mr. Kelly will be in charge of "After-Market" Sales of Purolator Oil Filters in six districts comprising the Central and Middle Western States. For the past fourteen years, Mr. Kelly has been sales representative for Purolator Products, Inc. in the Chicago district.

Penn's Special Research Laboratory Moved to Goshen

PENN Electric Switch Co.'s special Research Department, known as the "St Louis Laboratory," completed its transfer from St. Louis, Missouri, to the home plant in Goshen, Indiana, on July 30, 1943.

Directly supervised by Ralph Penn, Treasurer



All work—and no play!

At last engine controls have come out of the Doldrums!

The spectacular developments and improvements in ship propulsion equipment have now been reinforced by an equivalent advance in engine controls . . . W·A·B Pneumatic Systems.

W·A·B Pneumatic Remote Control Systems work every time—simply, positively, dependably. They eliminate the play, back-lash, and overrun that it is impractical to design out of the old, conventional mechanical types.

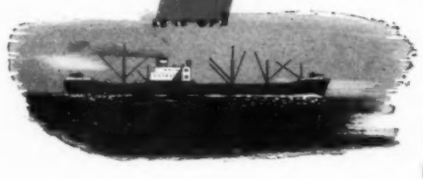
Control of an entire cycle of operation can be concentrated in one handle, through a combination of front and back, and lateral movements. Errors in sequence due to ignorance or under stress of emergency are impossible.

In graduated control operations—such as throttling—the smallest movement of the lever is duplicated exactly by a movement of the actuating mechanism. Engines can be synchronized, and their combined or individual speeds varied, to hair-line limits.

The control lines can be placed by the designer in the safest, most convenient location. Installation and maintenance require only ordinary ship-board skills.

One of our representatives will be glad to tell you how W·A·B Controls can help to improve the speed and precision of response of the engine room machinery in any ship you may be designing, building, or equipping. In many instances, the control problem can be solved by utilizing regular "off-the-shelf" W·A·B devices. If not, our Engineers will apply 74 years of pneumatic control experience to developing necessary special equipment. Phone, wire or write.

Westinghouse Air Brake Company
MARINE DIVISION
General Offices: Wilmerding, Pa.
74 Years of Pneumatic Control Experience



W·A·B

PNEUMATIC
PNEUMATIC-ELECTRIC
PNEUMATIC-HYDRAULIC
control systems

of the Company, this Department was founded in November, 1940 for the purpose of conducting research and experimental work on specialized new products.

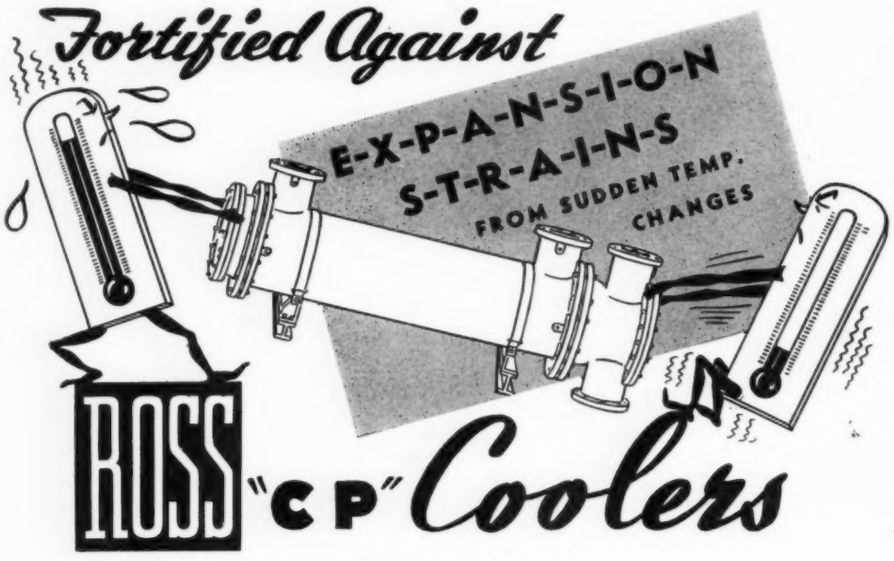
The particular development work undertaken has been completed and thus the equipment and personnel were moved to Goshen where production on these new controls is already under way. At the present time, these new devices are used for automatically controlling the temperature of both the oil and cooling liquid on Army and Navy airplanes.

According to the manufacturer, the developments have a multitude of temperature applications for the post-war period and they are expected to broaden considerably the company's peacetime markets. Penn Electric Switch Co. manufactures automatic controls for heating, refrigeration, pumps, air compressors and safety controls for internal combustion engines.

Bamberger Railroad Buys Two Alco-G.E. Diesel Locomotives

THIS new Alco-G.E. Diesel locomotive went into the service of the Bamberger Railroad in Utah recently. It is one of two new road switchers ordered by the Bamberger Railroad from the American Locomotive Company, and the first Diesel to be used on the Bamberger road. The Diesels will "streamline the road to meet its new wartime burden of both freight and passenger transportation," officials said.

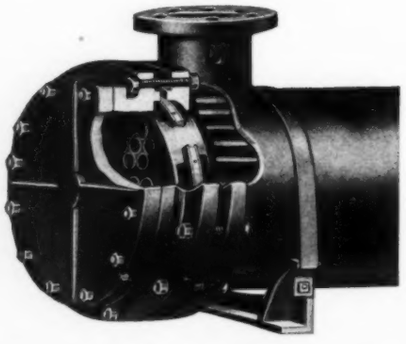
Inspecting the Diesel locomotive are Julian Bamberger (left), president and general manager of the railroad; Stephen G. Harwood (kneeling), Alco district sales manager of San Francisco, and N. W. Wiltsie, general superintendent of the railroad.



With severe temperature changes during starting-up and shutting-down periods, or through fluctuating operating conditions, there is an appreciable expansion or contraction in lube oil and jacket water coolers.

It is not uncommon that such strains cause serious damage to the cooling unit.

By means of the Ross externally packed floating head, the floating tube sheet is free to expand or contract relative to the shell. In this way, expansion strains are compensated for.



THAT'S NOT ALL! This head design prevents intermixing of dissimilar fluids and allows for easy dismantling when the tube bundle is to be removed from the shell.

Manufacturers of All Kinds of Heat Exchangers for over a Quarter Century

ROSS HEATER & MFG. COMPANY, INC.

Division of American Radiator and "Standard" Sanitary Corporation

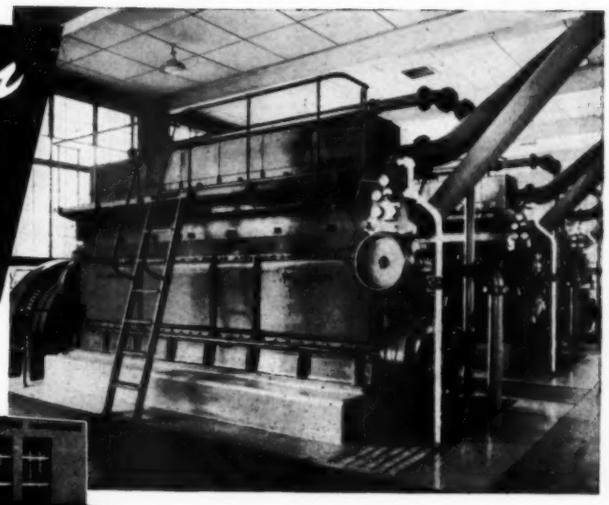
MAIN OFFICE AND PLANT 1407 WEST AVENUE BUFFALO 13, N. Y.

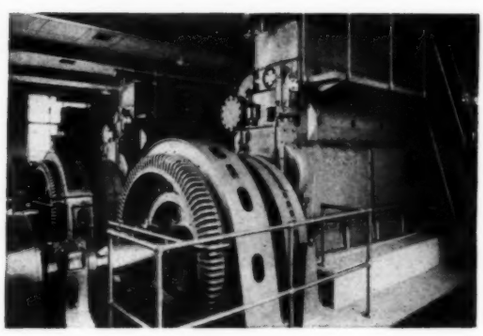
New Bonding Method Replaces Riveting or Spot Welding For Metal Assembly

A METHOD of bonding metal to metal, or rubber, synthetic rubber, plastics, leather or wood to metal, or to each other, with a bond in most instances stronger than the materials themselves, has recently been announced by The U. S. Stoneware Co., Akron, Ohio, manufacturers of Tygon synthetic materials and corrosion-resistant equipment.

The new process, known as the Reanite Bonding Process, develops a bond—metal to metal—which in repeated tests has shown itself to be stronger than riveted or spot welded joints. The normal bond between metals ranges from 1000 lbs psi to as high as 3000 lbs. psi. The bond developed between rubber and metal ranges from 900 lbs. to as high as 2000 lbs. compared to the average 250-400 lb. bond obtained by conventional processes. On tests of

Here's a Pattern FOR COMMUNITY POWER





DIESEL ENGINES 150 to 1500 hp.

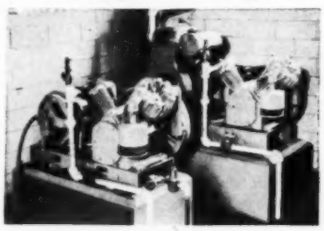
GAS ENGINES 175 to 2880 hp.

CONVERTIBLE GAS-DIESEL ENGINES 150 to 1500 hp.

An interesting example of rural community power planning, in cooperation with the Rural Electrification Administration, is the recently completed plant of the Western Michigan Electric Cooperative.

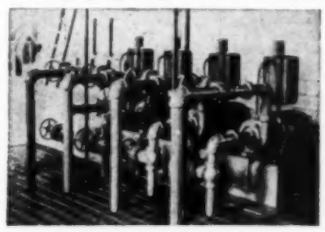
Here three Worthington 595-horsepower fully-enclosed diesel engines, driving synchronous generators, furnish economical power to nearly 1200 consumer-members on 340 miles of line. With its integrated Worthington auxiliary equipment as an assurance of uninterrupted operation, this station is regarded as a model of completeness and advanced methods. Now doing its part in providing power for war services, it stands ready to meet the expanded post-war needs of a forward-looking community. No section of the country is too remote for this kind of modernization.

Air compressors for starting



Rotary pumps for fuel oil transfer

Centrifugal pumps for jacket water circulation



DF3-4

WORTHINGTON

WORTHINGTON PUMP AND MACHINERY CORPORATION • HARRISON, NEW JERSEY

bonds formed between natural rubber, synthetic rubber, plastics, leather and wood, the materials themselves gave way before the bond.

The Reanite Process is suitable for use with almost all metals—iron, steel, stainless steel, magnesium, aluminum, aluminum alloys, copper, bronze and brass. The application of the process is simple. The surfaces to be joined are brushed, sprayed or dipped with Reanite. After drying, mild heat and pressure is applied.

The Reanite joint is unaffected by fresh or salt water, is non-corrosive to metals, possesses excellent corrosion-resistance in itself, and high dielectric strength. While the bond develops its maximum strength at room temperatures, its strength over a temperature range of from —40°F. to as high as 300°F. is substantially stronger than bonds obtained by conventional processes.

While Reanite is formulated through cyclical modifications of materials high on the critical list it is available for immediate shipment for essential end-uses.

Present uses include fabrication of aeroplane sub-assemblies, motor mounts, sound and vibration damper assemblies, instrument mounts, composite metallic and plastic units, and others. Future uses foreseen include pre-fabricated housing units, metal-clad plywood for kitchen cabinets, boats, airplane assemblies, etc.

Can Sabotage Engines

If, for any reason, the cooling water system fails, or oil pressure drops dangerously low, engine operation may be interrupted and serious damage to the engine may occur.

Because such power interruption may seriously affect urgent war production, many engine manufacturers have made Penn safety controls standard equipment. The controls will light a signal light, sound a warning alarm, or shut down the engine, as desired, in time to prevent damage from either cooling system or oil failure.

Easily applied to new or old engines, Penn safety controls provide inexpensive insurance against costly breakdowns and power interruptions. Write now for catalog. *Penn Electric Switch Co., Goshen, Indiana.*

PENN

A Star . . . for continued Excellence in Production

AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

Earl L. Ramsey to WPB

THE extent to which the Diesel industry of this country is contributing to the success of the war effort is again emphasized, this time by the announcement that Earl L. Ramsey, of Detroit, has joined the staff of the War Production Board at Washington. In his new duties he is associated with R. L. Vaniman, Director of the War Production Board's Automotive Division.

Earl L. Ramsey

Mr. Ramsey, well known in the Diesel engine field, is Manager of the Diesel Division of Ex-Cell-O Corporation, Detroit.

"Mr. Ramsey has been associated with our company for seventeen years, and for the last six years has devoted all his time to the management of our Diesel Division," said Phil Huber, President and General Manager of Ex-Cell-O, when asked about the announcement that Mr. Ramsey had gone to Washington.

IN THE TIGHT SPOTS IT'S A STAR

To meet special market conditions, American Can engaged STAR to accommodate a 25-cycle motor to a 60-cycle space in their high speed can-closing machine. This meant fitting the horsepower required to a space of smaller diameter. STAR—as usual—*engineered* this ticklish "tight spot" successfully through its unique welding process without special molds or castings. Just another example of Star performance which combines the flexibility of specialized application and engineering with standardized design.

Star Electric Motor Company
Bloomfield, N. J.

For 33 years, Star Motors have provided a complete line of standard as well as special motors—in sizes from ½ to 200 H.P. Today they provide dependable power for many applications. Write us about your requirements.

POWER PACKAGED AS YOU NEED IT

ARMY E NAVY

STAR MOTORS

New Diesel Engine Catalog Ready

IF you want the 1943 edition of the DIESEL ENGINE CATALOG, Vol. 8, edited by Rex W. Wadman—better order today. The most useful Diesel book available—nothing like it published—used the year 'round by engineers, consultants, sales forces and operators—constantly referred to for its wealth of Diesel information—an indispensable book for all interested in Diesels. Mail the coupon below—prompt shipment will be made.

DIESEL ENGINES, INC.

Two West Forty-fifth Street

New York 19, N. Y.

Enter my order for a copy of the New DIESEL ENGINE CATALOG, Volume Eight. Edited by Rex W. Wadman, for which I enclose $5.00.

NAME .....

ADDRESS .....

Please print name and address.

Ralph J. Cordiner Appointed Assistant to the President of General Electric

THE appointment of Ralph J. Cordiner as assistant to the president of the General Electric Company has been announced by Gerard Swope, president.

Mr. Cordiner, who resigned in June as vice chairman of the War Production Board, was formerly president of Schick, Inc. of Stamford, Conn., prior to which he was manager of the appliance and merchandise department of the General Electric Company.

Mr. Cordiner was closely associated with the selling of electrical appliances from his undergraduate days at Whitman College in Walla Walla, Washington. His first position was on a part-time basis with the Pacific Power and Light Company, and from money earned in selling electrically operated appliances he financed his four years at college, graduating with high honors in 1922. That same year he was made commercial manager of a division of the Pacific Power & Light Company. His record was such that in less than a year he was offered a position with the Edison General Electric Appliance Company with headquarters in Portland. Five years later he became Northwe manager and in 1930 moved to San Francis to become Pacific Coast division manager.

When the heating device section of the Edis General Electric Appliance Company was tra ferred from Chicago and consolidated with th company's merchandise department at Brid port in 1932, Mr. Cordiner went with it manager and chairman of the management co mittee. Two years later he was appoint assistant manager of appliance sales, and 1935 became manager of the radio division. year later he was promoted to assistant manag of the appliance and merchandise departmen and in January, 1938, succeeded Charles Wilson, now executive vice chairman of th War Production Board, as manager of the appl ance and merchandise department of the Ge eral Electric Company. Mr. Cordiner's offi will be at 570 Lexington Avenue, New Yor

American Hammered Announces "Porus-Krome" Plating of Piston Rings

RECENT removal of censorship restriction has permitted the release, by the Americ Hammered Piston Ring Division of Kopper

AGAIN, EXPERIENCE SHOWS

"YOU CAN'T BEAT MACK!"

That's why Morgan City Packing Company Operates 5 Mack-Powered Boats

When you build an engine the way Mack Mariner Diesels are built—to the highest standards in the industry—you're bound to see the results not only in extra stamina, dependability and efficiency, but right on the cost records too!

More and more fishing skippers are finding that out—and more and more are going Mack—for keeps!

MACK MANUFACTURING CORPORATION
Marine Engine Division, Empire State Building
New York, N. Y.

MORGAN CITY PACKING COMPANY
SHIPPERS OF
FRESH AND FROZEN HEADLESS SHRIMP
COOKED AND PEELED SHRIMP AND CRAB MEAT
SHUCKED OYSTERS
SHRIMP AND OYSTERS
MAIN OFFICE: HOUMA, LA.
May 13, 1943

Mack Manufacturing Co.
Marine Engine Division
Long Island City, N. Y.

Gentlemen:

About 3 years ago we very closely watched the performance of the "Charope" of our fleet and the "Jewel B," fishing for us—both of which were equipped with 605-W Mack Diesels, rating 100 H.P. at 1500 R.P.M.

So well did these engines perform over a long period of time under hard usage that we have since added the "Verna Lee," the "A. E. Ruiz" and the "Rimrod"—all powered with this same unit. All units with the exception of the "Rimrod" have a 3 to 1 gear. The "Rimrod" has a 2 to 1 ratio.

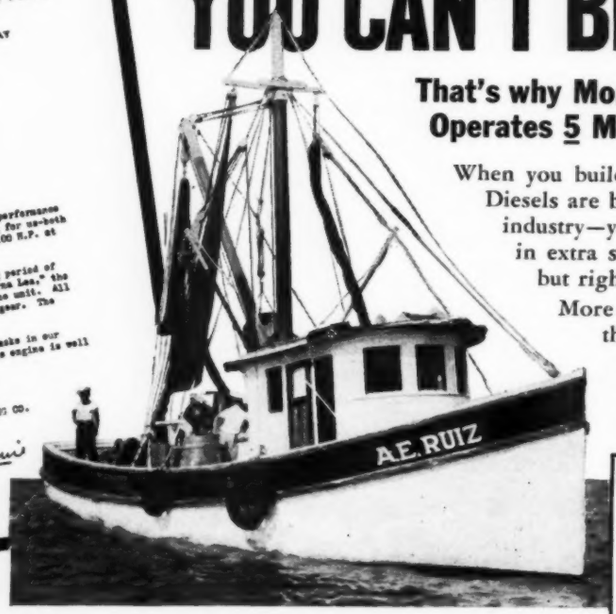
The continued trouble-free performance of Macks in our fleet has proved to us—on the most records—that this engine is well adapted to the hard, constant use on a fishing boat.

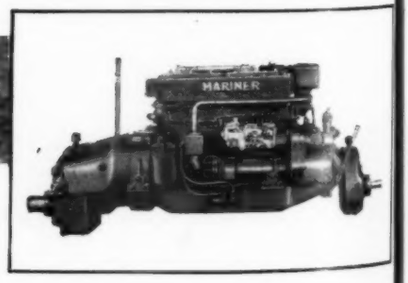
Yours very truly
MORGAN CITY PACKING CO.

Bertoul Cheramie

BC/lk

PLANTS: HOUMA, BERWICK, GOLDEN MEADOW.



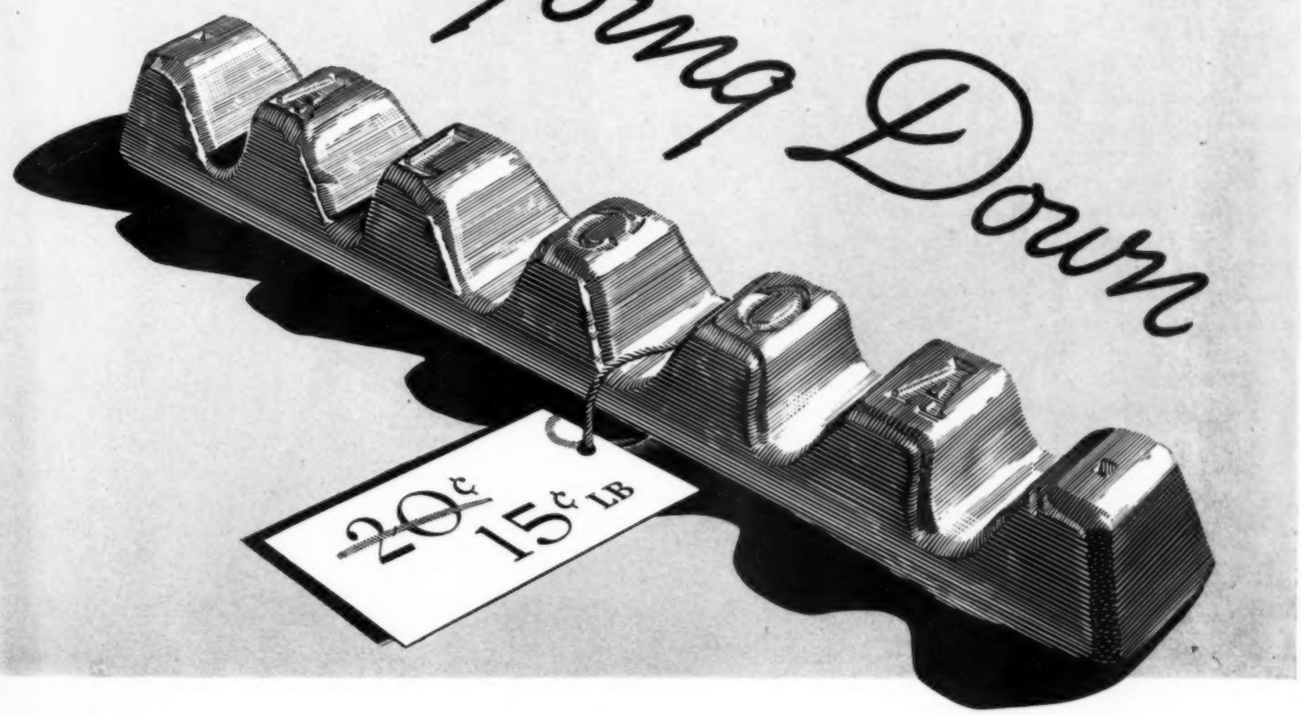


Mack DIESEL MARINE POWER

BUY U. S. WAR BONDS

MACK MARINE ENGINES ARE A PRODUCT OF THE BUILDERS OF WORLD-FAMED GASOLINE AND DIESEL-POWERED TRUCKS, BUSES AND FIRE APPARATUS

THE COST OF SAVING WEIGHT IS *going Down*



Do you think of a lighter weight Diesel as an expensive engine? The war may enable you to change your ideas on engine costs. Here's why—

The price trend for aluminum—important weight-saver for engine builders—has been continuously downward. Designers have further learned through war experience how to employ aluminum alloys to best advantage. Manufacturers are regularly producing and finishing large and intricate aluminum parts for war equipment, comparable to those they will be using in postwar Diesels.

So, a designer's first thought, when he is asked to reduce an engine's weight or compress a lot of power into a small space, is quite likely to be, "That's a good place for aluminum". Plenty of data on how to use it are available. The splendid performance of aluminum in fighting equipment leaves no doubt as to the dependability of this lightweight construction.

Tell your engine builders of any postwar uses you will have for lighter weight Diesels. ALUMINUM COMPANY OF AMERICA, 2141 Gulf Building, Pittsburgh, Pennsylvania.

VOLTE ALCOA · ALUMINUM ALCOA

Co. of an outstanding example of the "tremendous trifles" which are playing such an important part in American war successes.

By plating airplane piston rings with .005" of chromium (about the thickness of a sheet of book paper) on the cylinder contacting surface, our fighting aircraft have been able to fly five times as many hours between engine overhauls, even in Africa where the abrasive-like dust of the desert apparently has no ceiling.

Tightly locked on special arbors, the piston rings are lowered, by an overhead traveling crane, into one of a long series of tanks. Said to be the largest Chromium plating department in the world, the operation is based upon the Van der Horst Process, which American Hammered pioneered in this country. While experimental work pre-dates the war, the present department with its block-long line of plating tanks and generators, was planned immediately following Pearl Harbor, and has been in actual operation for over a year.

The "chrome" on airplane rings is not the bright, hard, plating used on automobile bumpers. Instead, it is known as "Porus-Krome"—gentle on cylinder walls, permitting ample lubrication and yet resisting wear to an extent that, if applied to Industrial Engines in post-war days, has long-life potentialities beyond any piston ring set-up ever known in the trade.

Fred M. Young Appointed to the Board of Western Metals Specialty Mfg. Co.

WESTERN Metals Specialty Mfg. Co. through its president, Alma E. Goetz announces the appointment of Mr. Fred M. Young as vice president and member of the board of directors.

Mr. Young has long been identified with the Young Radiator Company of Racine, Wisconsin serving as its president and general manager. In this latest announced capacity he will bring a valuable industrial experience gained in manufacturing fields allied to those of Western Metals Specialty Mfg. Co.

Horine of Mack Appointed to W.P.B.

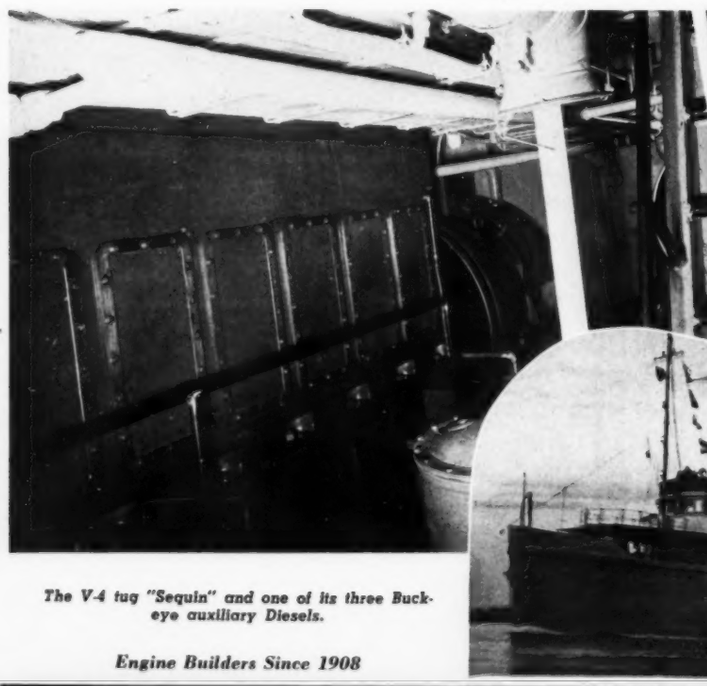
M. C. HORINE, sales promotion manager of Mack Trucks, Inc. has been appointed special consultant to the director, Automotive Division, War Production Board, it was announced recently.

Mr. Horine has been granted leave of absence from Mack and will make his headquarters in Washington. Regarded as one of the best informed men on motor transport in the automotive industry he has long been active in the affairs of the Society of Automotive Engineers and has served on many of its committees. He is a past chairman of the Metropolitan section S.A.E.

Kenneth F. Cramer Appointed By Baldwin Locomotive

KENNETH F. CRAMER has been appointed district manager of the New York office of The Baldwin Locomotive Works, succeeding Joseph F. Hoerner, who has been assigned to special duties in Washington, D. C., it is announced by Ralph Kelly, Baldwin president. Mr. Cramer will direct New York district sales for all divisions of the company.

Mr. Cramer began his association with the Baldwin Company in October, 1940, as Kansas City district manager for the Diesel division. In September 1942, he was transferred to the Chicago office, specializing in Diesel locomotive work. Since the war, Mr. Cramer has been dividing his time between the Baldwin office



The V-4 tug "Sequin" and one of its three Buckeye auxiliary Diesels.

BUCKEYE
Auxiliary Diesels

ON BIG V-4 TUGS

Three Buckeye Diesel generating units supply current for ships services aboard the U. S. Maritime Commission's big V-4 tugs which require more current than many a fair sized town. These are heavy duty engines — capable of continuous service over long periods and intermittent heavy overloads. Buckeye engineering skill and long engine-building experience assures the Maritime Commission that these engines will perform as expected.

Engine Builders Since 1908

Be Profitwise and Dieselize with Buckeyes
THE BUCKEYE MACHINE COMPANY ..... LIMA, OHIO

THIS TOOL BELONGS
WHEREVER DIESELS ARE MAINTAINED!

No Diesel can deliver a smooth, efficient flow of power with improperly-adjusted nozzles . . . and there's no quicker, cheaper or faster way to adjust nozzles "right on the nose" than to set them *right* with a BUDA Nozzle Tester.

With a Buda Nozzle Tester in your tool kit, you have a complete nozzle-testing "laboratory" right at hand. You can fasten it to a bench near the stationary Diesel, or clamp its broad base right on the tractor, power shovel or other Diesel-powered machine you're working on . . . no time lost sending nozzles out for testing! Connect the nozzle to the tester with one of the four standard couplings that come with it, fill the reservoir with clean fuel, pump the handle and watch the gauge — it tells you *exactly* the injection pressure the nozzle's set for. Follow the simple instructions in the Buda kit and you'll have a set of accurately, uniformly-adjusted nozzles ready to make your Diesel purr in a matter of minutes!

This $35.00 Buda Nozzle Tester belongs in your tool kit . . . if the Diesel manufacturer didn't include it with the engine (many of them do), you'll be dollars and hours ahead to buy one *now*. Write for your copy of the Buda Nozzle Tester Bulletin No. 1144 today!

Picture shows easy adjustment of nozzle while mounted in tester.

Here's your complete portable "laboratory" . . . the 12-lb. BUDA Nozzle tester with all attachments in a sturdy, neat carrying case!

THE BUDA CO.

Harvey (Chicago Suburb) Ill.

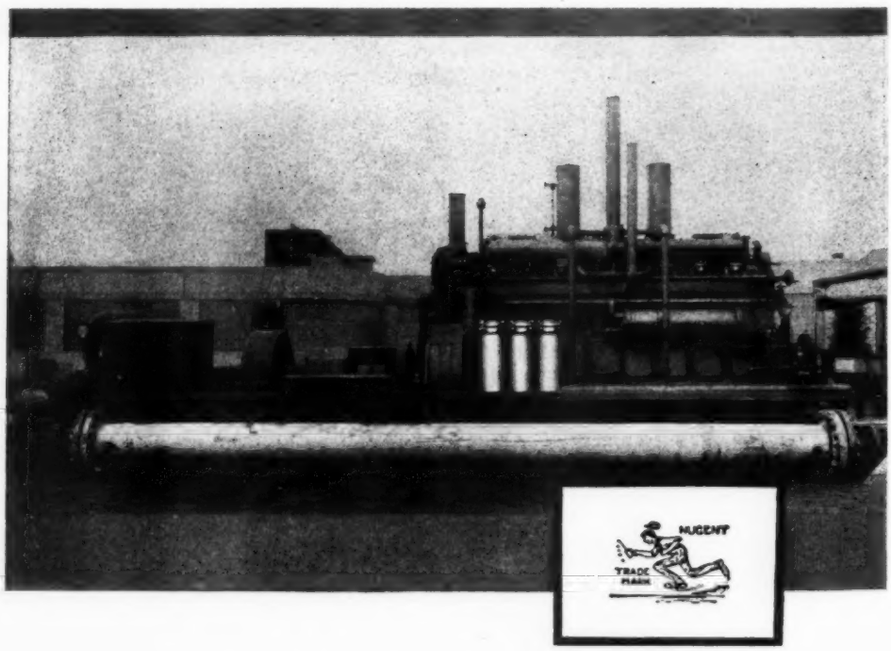
BUDA
ESTABLISHED
1881

in Kansas City, Chicago and Washington, in connection with negotiations with various branches of the Federal government and the armed forces.

Mr. Cramer was born in Fulton, N. Y. and received his early education in the schools of Syracuse. After graduating from Syracuse University in 1928 with a degree in mechanical engineering, he was employed by the Worthington Pump and Machinery Corporation at their Harrison, N. J., and Buffalo plants. At Buffalo he was test and experimental Diesel engineer for Worthington.

In July, 1929, Mr. Cramer joined the McIntosh and Seymour Corporation (later Diesel Engine division, American Locomotive Company) at Auburn, N. Y. After some months in the experimental and testing departments, he was transferred to their New York sales office and later to the main sales office at Auburn. Following that assignment he was in charge of McIntosh and Seymour Diesel sales in Chicago for two years, then returning to New York. He was in private business for two years before joining the Baldwin organization.

Kenneth F. Cramer



The Key to Better Diesel Engine Operation . . .

The Absorbent Filter Recharge used in this Nugent Absorbent Depth Type Pressure Filter absorbs four times its own weight of water, dirt and impurities, yet it does not remove additives embodied in the oils.
Fig. 1280A .5 4L

Clean oil, as secured through the use of Nugent Filters, can add hours of life to Diesel engines . . . reduce maintenance costs and help increase engine efficiency.

The above installation is typical of how Nugent Filters are helping today's industries. It shows one Nugent Absorbent Type Fuel Oil Filter and two Nugent Lubricating Oil Filters installed on a Cooper-Bessemer Diesel engine which is connected to a Worthington centrifugal pump. The installation is located at a well known pipeline station and is used to "pick-up" oil for high pressure line or for increasing main line capacity.

Nugent Absorbent Type Filters are available in a wide range of sizes for Diesel engines from 1 to several thousand H.P. in single containers. Write for details today.

WM. W. NUGENT & CO., Inc.
415 N. Hermitage Ave., Chicago 22, Ill.

NUGENT FILTERS

SINCE 1897

Noted Britisher Visits Enterprise Plant

A RECENT distinguished visitor at the Enterprise Engine and Foundry Company of San Francisco, was Victor W. Bone, head of two of England's greatest war plants. Mr. Bone, managing director of the Ruston Hornsby Engine Works of Lincoln, England, and also managing director of the Ruston Bucyrus Works, has come to America to get an accurate picture of America's war industries.

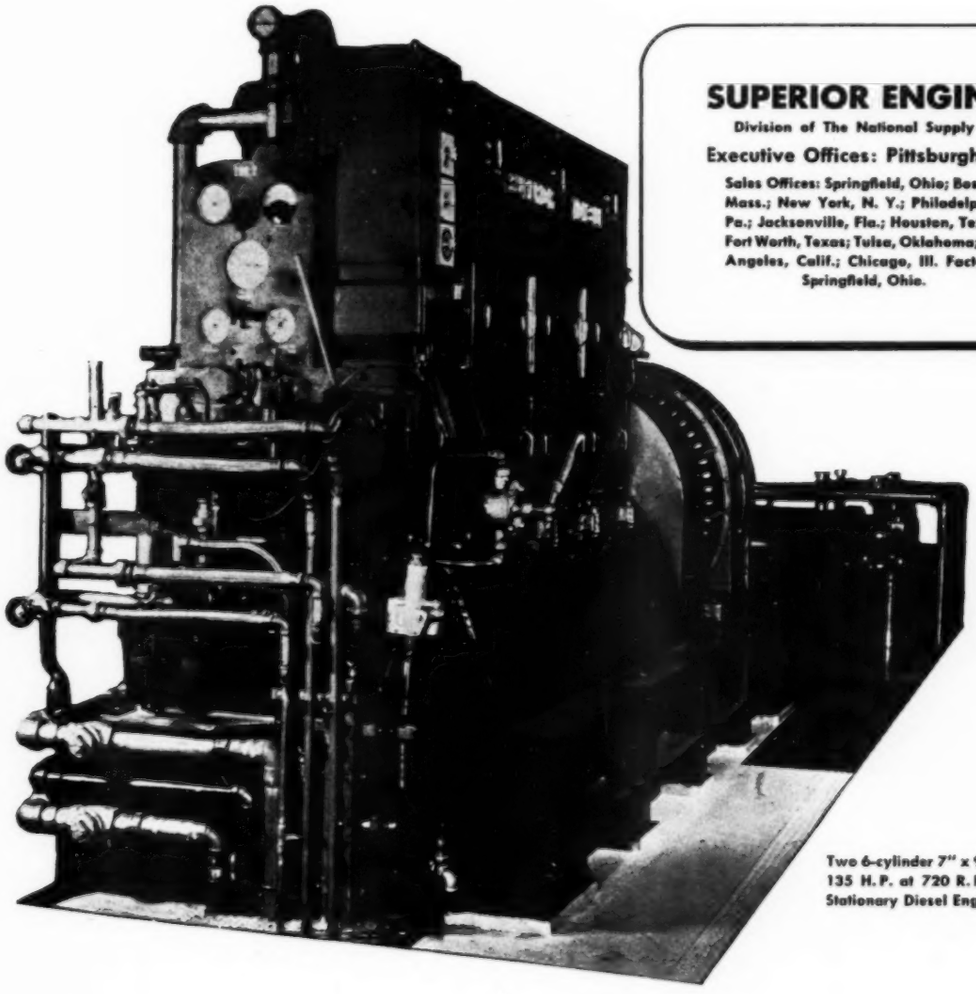
Left to right: Charles Hoehn, Jr., Supt. of Foundries; Charles Hoehn, Sr., President; Victor W. Bone, and Charles G. Cox, Vice President

Mr. Bone said that he would not have considered a tour of American war plants complete without a trip to the West Coast and its great industrial organizations. Enterprise was one of these he selected to visit, and after his tour of the plant on July 16, Mr. Bone expressed himself as being deeply impressed with the produc-

Vital American Industry chooses *Superior* DIESELS

ONE of America's largest companies, with branches from coast to coast, has installed proven Superior Diesels to be used as standby power.

This company's business is of such a critical nature that power failure, even for an hour, would be a serious hindrance to our war effort. Their choice of Superior Stationary Diesels for standby power is another very real tribute to the quality, economy and absolute dependability of this great engine.



SUPERIOR ENGINES

Division of The National Supply Co.

Executive Offices: Pittsburgh, Pa.

Sales Offices: Springfield, Ohio; Boston, Mass.; New York, N. Y.; Philadelphia, Pa.; Jacksonville, Fla.; Houston, Texas; Fort Worth, Texas; Tulsa, Oklahoma; Los Angeles, Calif.; Chicago, Ill. Factory: Springfield, Ohio.

Two 6-cylinder 7" x 9"—
135 H.P. at 720 R.P.M.
Stationary Diesel Engines

tion job being done at Enterprise and was enthusiastic in his appreciation of the spirit of cooperation and sincerity shown by employes.

Mr. Bone also warmly praised the machines, equipment and production methods developed at Enterprise for turning out Diesel engines for wartime use, and compared it favorably with other war plants, in America and England. Both of the companies with which Mr. Bone is associated in England are devoting all their facilities to important and secret war work. The Ruston Bucyrus Company was formed by its parent organization, the Ruston Hornsby Works, combined with the American Bucyrus-Erie Company, the two companies cooperating in war production for the United Nations.

Cyrus R. Osborn Elected Vice President in Charge of the Electro-Motive Division of General Motors

CYRUS R. OSBORN, recently elected vice president of General Motors Corporation, in direct charge of the Electro-Motive Division at LaGrange, Illinois, was born in Dayton, Ohio on August 27, 1897. He received his early education in Dayton public schools and was graduated from the University of Cincinnati with a degree in Mechanical Engineering in 1921.

Cyrus R. Osborn, General Motors Vice President in charge of the Electro-Motive Division.

Mr. Osborn's first employment with General Motors was as an apprentice in the Dayton Engineering Laboratories Company in July 1921 and he became a field service engineer a few months later. In December, 1923, he became technical manager of Overseas Motor Service Corporation and in September, 1925 he was named general manager of that organization. From 1929 until 1932, he served as general manufacturing manager of GM Export Division. In May of the same year he went to Stockholm, Sweden, as managing director of General Motors Nordiska. He remained in Stockholm until February, 1934, after which he served on special assignments in Mexico and England.

At the beginning of 1935, Mr. Osborn was placed in charge of engineering for the Overseas Division and a year later was made assistant to the general manager. Early in 1936 he was sent on special assignment to Adam Opel A. G. in Russelsheim, Germany and in July of the same year, became special assistant to the general manager there. He was appointed general manager of the Opel operation on July 1, 1937. He returned to this country in June, 1940 and became active in defense material relationships at the central office in Detroit. In 1941 he was appointed assistant to Mr. R. K. Evans, vice president of General Motors in charge of the General Engine Group, which includes the

U. S. NAVY SEAPLANE TENDER
AIDING
UNINTERRUPTED PATROL
UNINTERRUPTED POWER
SEAPLANE tenders are indispensable factors in the maintenance of uninterrupted vigil by our fleet of long-range patrol seaplanes. Consequently, the U.S. Navy employs every means to protect the personnel and equipment on these vessels. The direct-reading PREMAX Engine Pressure Indicator is one of the modern instruments aboard Diesel-powered seaplane tenders. It is used to check compression and firing pressures—proper maintenance of which assures safe, dependable, economical engine performance.
The PREMAX is ideally suited for service at sea. Rugged, durable—requires no skill, scaling of diagrams, or calculations. Easy to operate and understand—maximum cylinder pressures are read instantly directly from the scales. For many years, the PREMAX Indicator has faithfully served industry as an aid in the efficient operation of stationary, railroad, and automotive Diesels. Today it is serving the U.S. Navy where it is used on Diesels in scores of auxiliary and combat units of the fleet.
DIRECT – READING
PREMAX
ENGINE PRESSURE INDICATOR
INVEST IN BONDS FOR VICTORY
PREMAX
SAVE FUEL
PROTECT PRECISION PARTS
BACHARACH
INDUSTRIAL INSTRUMENT CO.
7000 BENNETT STREET, PITTSBURGH, PA.

PLANTS IN: ST. LOUIS, MO. • PITTSBURGH, PA. • MEADVILLE, PA. • JERSEY CITY, N. J. • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

Electro-Motive Division. He was elected a vice president of the Corporation on August 1, 1943.

Mr. Osborn married Jeannette Powell, of San Diego, Cal., in 1926; they have two children. He is a member of the Society of Automotive Engineers, of Phi Delta Theta and Tau Beta Pi, honorary engineering society.

Rogers Diesel and Aircraft Corporation Appoints Hofmeister Hill General Manager

EFFECTIVE July 26, 1943, the Rogers Diesel and Aircraft Corporation announced the appointment of Carl Hofmeister as General Manager of the Hill Diesel Engine Company, Lansing, Michigan division of the organization.

Mr. Hofmeister, recently controller of the Cummins Engine Company, and employed by that organization for the past eleven years, has also been associated with the Curtiss Wright Company at St. Louis and the Allison Engine Company, Prest-O-Lite and Stutz Company in Indianapolis.

His splendid background and experience in the industrial field, and especially in the manufacture of engines, will be beneficial in maintaining peak production of war goods at the Hill Diesel Engine Company, and in helping to formulate this organization's plans for its post war operations.

Carl Hofmeister

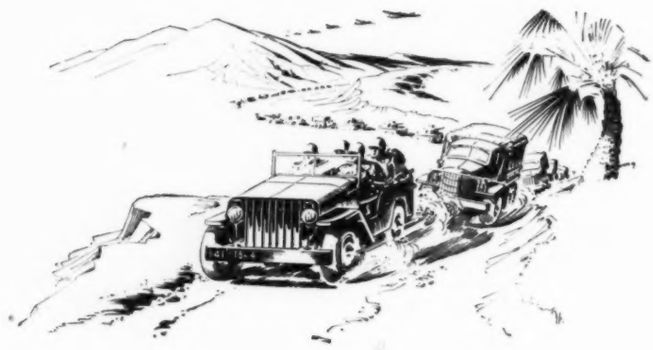
William E. Doll

GUSTAVO Preston Company announces the sudden death of its president, William E. Doll, on July 22.

Mr. Doll was long identified with the Diesel industry. He was connected with the Worthington Pump & Machinery Company for sixteen years as manager of their St. Louis and later Detroit offices, and in 1931 became president of the Gustavo Preston Company in Boston.

The Gustavo Preston Company represented the Stationary Division of Winton Engine Corp. until they discontinued same in 1936, and since 1936 the company has been representing the National Supply Company Superior Engine Division, on their stationary engines and Busch-Sulzer Diesel Engine Company on their large engines.

Mr. Doll was a graduate of Cornell University Engineering School, Class 1911, and before his association with Worthington, was with the Curtis Pneumatic Machinery Company in St. Louis, and the George D. Roper Corp.



Everything HINGES on lubrication...

We won't go into the "causes and effects" of lubricating oil failures. Engineers want to *know how* to prevent trouble and damage *before it happens.*

That's the VISCO-METER'S* job... and what a whale of a job it's doing on land and sea... watchdoggin' on the gasoline and Deisel engines that power many units of our transports, fighting machines and service equipment.

Uncle Sam enlisted the VISCO-METER* long before Pearl Harbor when, in several branches of government service, the VISCO-METER* had proved its worth. No wonder then that today every VISCO-METER* we make goes with some gasoline or Deisel engine consigned for war service.

With the Peace, VISCO-METER* will again be available to those internal combustion engine manufacturers... automotive, marine and stationary... who will acquaint themselves with its decided advantages. There's nothing so convincing as a service record and it's not too soon to talk to a VISCO-METER* engineer.

VISCO-METER
CORPORATION GROTE ST., BUFFALO, N. Y.

VISCO-METER: a 12-ounce precision instrument continuously indicating to the operator the viscosity (lubricating ability) of the crankcase oil while the engine is in operation.

**Fully covered by U. S. and Foreign Patents*

Answering your biggest problem:
How to make Diesels
last longer, perform better.

DIESEL FUEL *Concentrate*

A Houghton contribution to the Diesel fuel problem

Shutdowns, maintenance delays, power loss—the great obstructions to Diesel efficiency—can be traced largely to imperfect combustion. Soot, carbon and gummy deposits, the by-products of burning fuel and partial decomposition of lubricant, form the cause of power loss and engine failure.

Deposits in the top-cylinder region clog injector nozzles, obstruct valve seats, valve stems, valve guides. Piston rings and grooves fill and stick. Soon the engine is laboring under heavy strain; maintenance operations crowd closer together; the Diesel is then no longer an efficient unit.

A secondary source of inefficiency and delay is in the injector pump and its line, where intricate and closely fitted parts are fouled by deposits of gums and resins. Needle valves "weep," injectors close imperfectly, fresh handicaps are imposed on Diesel performance.

Houghton Diesel Fuel Concentrate—5 gallons to 1000 gallons of fuel—attacks causes of power loss and engine failure at the source. It keeps nozzles, valves and the upper cylinder region free from deposits—the injector line clean and free-functioning. The engine runs cooler, power output is restored, maintenance is diminished, fuel waste disappears. Diesel Fuel Concentrate has a long record of successful application. Engineering service by technical representatives who know perfect Diesel performance and how to promote it, is available on request.

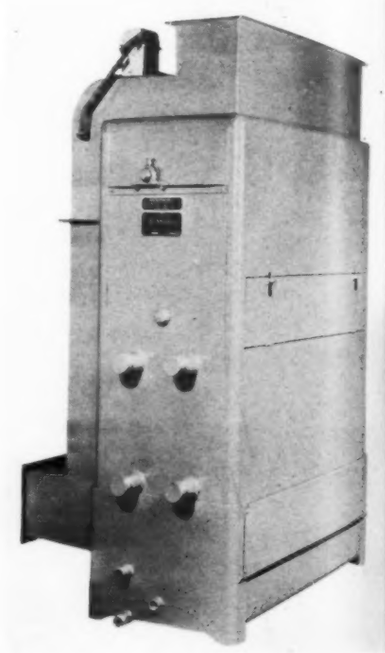
Houghton's Fortified
DIESEL ENGINE OILS
Treated Lubricants for all types of Diesel Engines, having:
TRIPLE FILM STRENGTH
HIGHER OILINESS
CORROSION-INHIBITING PROPERTIES
GUM SOLVENT ABILITY

E. F. HOUGHTON & CO.
Philadelphia and all principal cities in the United States and Canada

New Development in Evaporative Type Heat Exchanger

A NEW development for adding heat to industrial liquids for the purpose of maintaining constant temperatures as desired, with automatic control, is announced for the Niagara Aero Heat Exchanger. This has not been previously done with the evaporative type liquid cooling unit using a water spray and fans to draw air over coils containing the liquid whose temperature is to be controlled. This is accomplished by using either a steam coil or injector or an electric heating unit to heat the spray water. U. S. Patent No. 2,321,933 has recently been granted on this equipment.

The result is control of liquid temperatures within prescribed limits, alternately cooling or heating as required. The heating device is put into operation by thermostatic control at the desired point, preventing the liquid from becoming too cold for the process in which it is used, or from becoming viscous with retarded flow and loss of capacity, or from congealing or freezing. This also makes it possible for the Heat Exchanger to be successfully installed of doors, or to use fresh, out-of-door air to increase its evaporative cooling capacity and avoi damage from handling air containing corrosi substances.

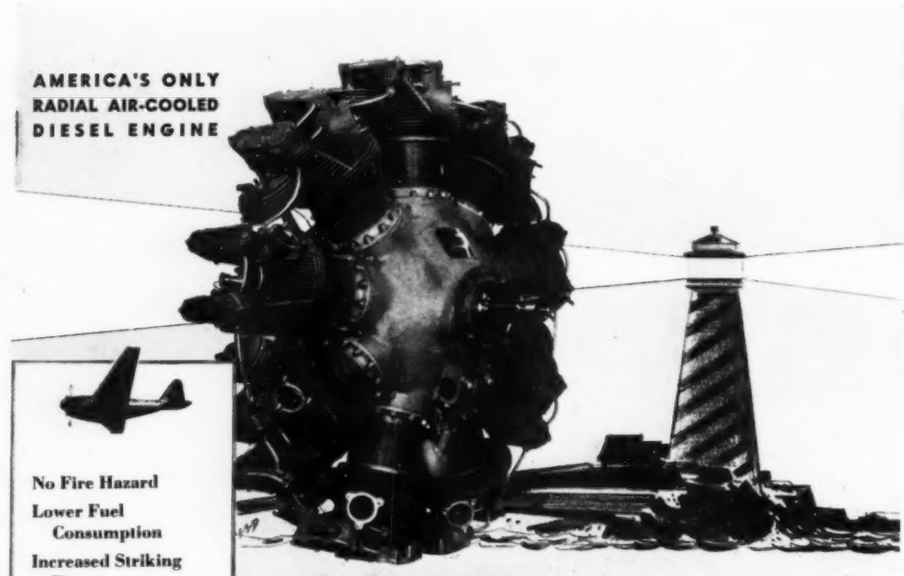


Niagara Aero Heat Exchanger equipped wit automatic heat control.

The Heat Exchanger with these features is use to control temperatures in industrial, chemica process and electrical equipment by controllin jacket water temperatures, also quenching bath in the heat treating of metals, cutting oils and lubricants in metal working, machining and wire drawing, controlling temperatures of chemical process liquids in many fields, and engine jacket water. It is also applied to air and gas compressors. It is manufactured by Niagara Blower Company, 6 E. 45th Street, New York 17, N. Y.

We Were Misinformed

IN the article titled "Diesel Supplies Meat For The Nation" which appeared on pps. 44 and 45 of the August issue of DIESEL PROGRESS it was stated that the plant of the Superior Packing Company is located in Minneapolis, Minnesota. We are now informed that the correct address of this plant is 2125 Wabash Avenue, Saint Paul, Minnesota. Our apologies and thanks to the Saint Paul Association of Commerce for this correction.



SAFE LIGHT WEIGHT DIESEL
POWER

- No Fire Hazard
- Lower Fuel Consumption
- Increased Striking Range
- Greater Stamina
- Dependable Operation
- Instant Response to the Throttle
- No Ignition System
- Lower Cost of Fuel
- Constant Torque at All Speeds
- No Radio Interference

FOR TANKS • FOR PLANES • FOR SHIPS

Using fuel that will not burn even when exposed to open flame, the Guiberson completely eliminates the usual fire hazard from the power plants of tanks, planes and ships, and there is no ignition system to cause sparks or interfere with radio operation. Weighing less than two pounds per horsepower, the new light weight Guiberson diesel hits harder, faster, farther. Safe and dependable, Guiberson powered equipment is hitting the Axis on the battle lines of the world and is ready to serve on land, sea and in the air.

Guiberson U.S.A.

ESTABLISHED 1919

GUIBERSON DIESEL ENGINE COMPANY
Dallas, Texas

THE GUIBERSON CORPORATION
Aircraft and Heater Division

Major General Lewis A. Brereton Inspects Alco-G. E. Diesel Locomotives Speeding Aid to Russia Through Iran

RUSSIAN soldiers, surging forward against Hitler's mechanized hordes, have a new ally this summer in the American Locomotive Company-General Electric Diesel locomotives which are now part of the Trans-Iranian Railroad.

Many of the crews of these Diesels were recruited from among Alco employees. When the first of these Diesels arrived in the Middle East some weeks ago, Major General Lewis A. Brereton, Commanding General of the U. S. Army in the Middle East, made an inspection of the equipment.

This OWI photograph just arrived in the U. S. from Iran shows Major General Brereton (left) going over the fine points of the Alco-G.E. Diesel with Major William C. Rogers, Commanding Officer of the Diesel battalion, who formerly was district service engineer operating out of the New York City office of the American Locomotive Company.

West Coast Deisel News

By JIM MEDFORD

FAIRBANKS-MORSE Diesels will supply all power for the new 148-foot combination vessels under construction by the Bellingham, Washington yard of the Norwestern Shipbuilding Co., for Army Transportation: main engine, a 875 hp. and auxiliaries, three 60 hp. to generators.

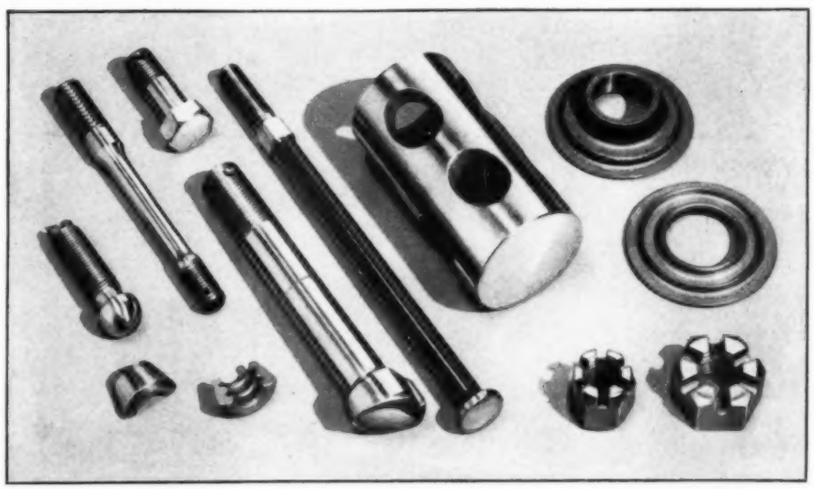
A Cummins 68 hp. Diesel will power the new halibut boat, 42 feet o.a., under construction for Ole Vea by the Park Shipyard, Vancouver, B. C.

Another British Columbia Diesel installation, a 240 hp. Washington Iron Works engine was made in the 78-foot *Western Commander* for Nelson Brothers at the Star Shipyard at New Westminister, B. C.

At San Diego, California, the Campbell Machine Co. have completed installation of a Caterpillar 70 hp. Diesel fitted with Burgess intake snubber and direct connected to Fairbanks, Morse D. C. generator in the new 80-foot *Victory* for M. O. Medina.

Another vessel of Van Camp Sea Food Company's fleet, Neil Burton's 76-foot purse seiner, has been repowered with a Caterpillar V-8, 135 hp. at 900 rpm. Diesel with 3 to 1 Twin Disc gears and a 57-inch Lambie wheel.

Higginbotham Brothers, Stockton, California, are completing two 60-foot tugs for their own towing service, each powered with two Caterpillar 115 hp. Diesels with Twin Disc gears and Lambie 51-inch wheels.



AIRCRAFT QUALITY
Hardened
and Ground Products

"CHICAGO SCREW QUALITY"—Milled from Bar and Cold Upset Products are meeting the exacting requirements of the Diesel Industry, and the Armed Services. We are specialists in the manufacture of Valve Tappets, Push Rods, Valve Spring Retainers, Connecting Rod Bolts, Studs and other related products.

All secondary operations completed in our own plant, such as Slotting, Milling, Drilling, Broaching, Hardening, Grinding, Thread Grinding, Thread Milling, etc.

ARMY E NAVY

THE CHICAGO SCREW CO.
ESTABLISHED 1872
1026 So. Homan Avenue Chicago, Ill.

An outstanding Diesel industrial unit is under construction by Shepherd Tractor and Equipment Co., Los Angeles, for oil field use by the Harbor Production Service Co., Wilmington, Calif. Two Caterpillar Diesels 115 hp. and 85 hp. paralleled for operation of Gardner-Denver slush pump of 1,800 lbs. pressure, will be mounted on specially constructed frame with pump to form single mobile unit weighing 40,000 pounds.

The Sun Harbor Packing Co., San Diego, California, are repowering the *Sun Goddess*, ex *Galicia*, with a 185 hp. Union Diesel and two auxiliaries, 40 hp. Unions.

The Cummins Diesel Sales Co., Vancouver, B. C., reports the sale of Cummins Diesels to Neil Hansen for his 40-foot *Kinky Kid* and to Fred Clarke for his 40-foot *Naomi No. 2*, both fishing boats out of Vancouver.

Swinging a 7-foot "square" wheel, the repo
ered steam tug *Fearless* of the Coastal Tow
Co., Victoria, B. C., gets 133 rpm. running li
with her new Mack Mariner Diesel of 100 h
at 1,500 rpm. driving through Twin Disc 3 to
gear to chain reduction gear, a total reducti
of 12 to 1 on four-bladed propeller.

Contract has been awarded the Seattle Sh
building and Drydock Co., Seattle, Washingto
for construction of two 154-foot cable repo
barges for Army Transportation Corps, Alas
area. Buda 150 hp. Diesels with 3 to 1 reducti
gears have been selected as auxiliary pow
units.

Missiwit, one time leading private yacht on S
Francisco Bay is now converted into a comme
cial fishing boat by Jim Brand at Newport Ba
California. Her old slow speed Diesel is bei
replaced with a modern Caterpillar 831 cub
inch marine Diesel.

Another vessel has been completed by the Sh
den Jackson Mission School at Sitka, Alask
This time it is a 65-foot purse seiner, the S
II, and she gets 8 knots with her new Atl
Imperial 4 cylinder, 60 hp. Diesel. This is th
third vessel built by the school.

Another harbor ferry for San Diego, Californi
the *Point Loma*, a 64-footer goes into servic
by the Star and Crescent Boat Co. built by th
San Diego Marine Construction Co., she is pow
ered with a pair of Cummins 6 cylinder, 12
hp. Diesels. Seating capacity is for 450 person

Cooper-Bessemer two cycle, eight cylinde
Diesels rated 675 hp. at 400 rpm. will powe
the new 96-foot tugs under construction by th
Pacific Boatbuilding Co., Tacoma, Washington
for the U. S. Army Engineers.

Stephens Brothers, Stockton, California, have
received contracts for the new 72-foot Arm
tugs to be powered with single Fairbanks-More
350 hp. Diesels.

FOR VICTORY BUY WAR SAVINGS BONDS AND STAMPS

The *dependable* job Globe Spinning Power Batteries are doing in Koehring Dumptors is typical of Globe Diesel-starting performance.

Do you have a Diesel-starting problem? Let a Globe engineer survey your needs. Address nearest factory.

GLOBE-UNION INC., *Milwaukee 1, Wisconsin*

ATLANTA • BOSTON • CINCINNATI • DALLAS • KANSAS CITY
LOS ANGELES • MEMPHIS • MINNEAPOLIS • PHILADELPHIA • SEATTLE

DP-943

1943 EDITION OF THE DIESEL ENGINE CATALOG IS NOW AVAILABLE. ORDER YOUR COPY TODAY. CONVENIENT COUPON ON PAGE 92 OF THIS ISSUE.

Latest Diesel Patents

description of the outstanding patented inions on Diesel and Diesel accessories as they granted by the United States Patent Office. is information will be found a handy refere for inventors, engineers, designers and oduction men in establishing the dates of ord, as well as describing the important Diesel inventions.

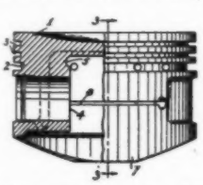
Conducted by C. CALVERT HINES

2,309,477
PISTON RING
Harold P. Phillips, Hastings, Mich., assignor to Hastings Manufacturing Company, Hastings, Mich.
Application January 31, 1941, Serial No. 376,863
3 Claims. (Cl. 309—45)

1. A piston ring assembly comprising axially spaced thin split annular ribbon-like cylinder wall engaging members formed of ribbon steel having the outer portions thereof axially offset relative to the inner portions thereof providing inner portions disposed in parallel planes and outer portions disposed in planes offset axially toward each other from their inner portions, the offsets providing facing annular abutments, a split annular combined spacing and thrust transmitting intermediate member disposed between said cylinder wall engaging members and in axially spacing relation thereto and in cooperating relation to said abutments thereof to exert radial expanding force thereon, and an expander disposed between said cylinder wall engaging members, said intermediate member having rockable supported engagement with said expander in radially compressed condition of the latter and exerting radial expansive thrust individually and independently on said first named members, derived from the expansive force of said expander.

2,309,555
PISTON
William M. Venner, Clayton, and Percy L. Bowser, Jr., University City, Mo., assignors to The Sterling Corporation, St. Louis, Mo., a corporation of Delaware
Application March 30, 1942, Serial No. 436,736
9 Claims. (Cl. 309—11)

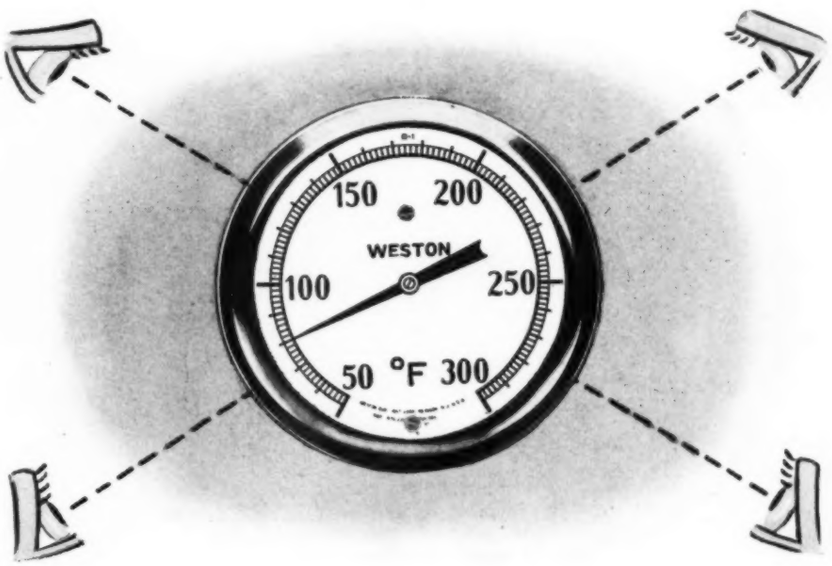
1. A light-metal trunk piston for internal combustion engines, having a head provided with a flange adapted to receive packing-ring grooves, a skirt depending from said head, and wrist-pin bearings connected with said head, said skirt being axially short in comparison with its diameter and having cylinder-bearing portions connected with said head, one of said



cylinder-bearing portions being formed with a transverse slot dividing said portion into upper and lower sections, said upper section having an oval contour with its major axis transverse to the wristpin axis, and said lower section having a similar oval contour but with a greater major axis than said upper section, said contours merging adjacent the ends of said slot.

2,292,409
INTERNAL COMBUSTION ENGINE
George K. Steward, Denville, N. J.
Application May 11, 1939, Serial No. 272,982
2 Claims. (Cl. 123—32)

1. In an internal combustion engine having a cylinder, a firing chamber remote from the cylinder, and a firing chamber located intermediately between the cylinder and the remote firing chamber, the method of preparing a power charge in the cylinder, and preparing two firing charges one in each of the firing chambers to promote the combustion of the power charge, said method including the following, supplying air to the cylinder and supplying air to the firing chambers simultaneously but to the firing chambers independently of the air supply to the cylinder, utilizing the air while being introduced into the firing chambers to scavenge each one of them of products of combustion of a previously fired charge, compressing the air in the cylinder and the air in the firing chambers, introducing fuel oil into the compressed air in the cylinder and into the compressed air in the firing chambers in proportions to produce a leaner mixture in the intermediate firing chamber than in the cylinder and still a leaner mixture in the remote firing chamber than in the intermediate firing chamber, igniting the mixture in the



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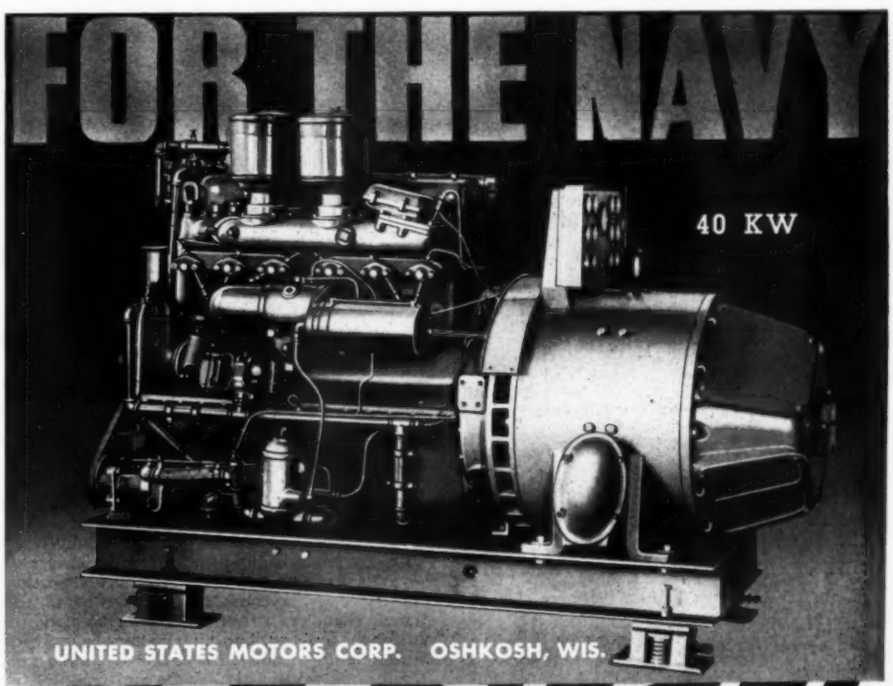

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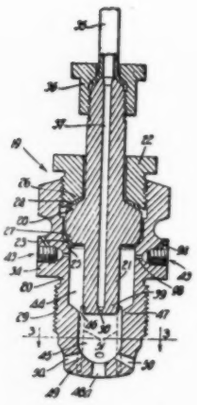
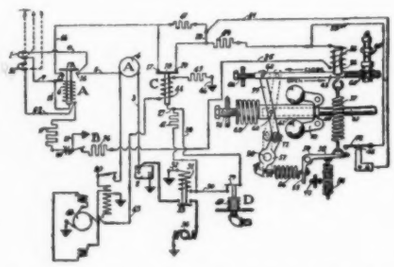


cylinder and the firing chambers by compression, projecting the burning gas of the intermediate chamber into the cylinder, and utilizing the expanding gas of the remote firing chamber to act on the burning gas of the intermediate firing to thereby increase the fire travel of the gas projected from the intermediate firing chamber through the cylinder.

2,292,189
STARTING SYSTEM FOR COMPRESION IGNITION ENGINES
Earl R. Witzel, Kohler, Wis.
Application October 6, 1941, Serial No. 413,738
9 Claims. (Cl. 290—38)



9. In a starting system for compression ignition engines, the combination of a compression ignition engine, a fuel injector adapted to supply fuel thereto, means for adjusting the quantity of fuel delivered by said injector, means operable upon closing of a starting switch for varying said adjusting means to supply fuel to the engine, means responsive to the speed of said engine to further vary said adjusting means to regulate the supply of fuel whereby to control the speed of said engine and means for varying said adjusting means to cut off the supply of fuel whereby to stop said engine.

2,291,860
INTERNAL COMBUSTION ENGINE
Mark W. Anthony, Tyler, Tex.
Application January 25, 1941, Serial No. 375,983
5 Claims. (Cl. 184—6)

1. In an internal combustion engine, a body having parallel crank and transmission chambers communicating through a restricted passage, a reservoir chamber in the lower portion of the body, a crank shaft journaled in the crank chamber, a transmission shaft extending through the transmission chamber, a pair of intermeshing timing gears secured to the said crank and transmission shafts and mounted in communicating chambers on the body, the said gears being operable to generate fluid pressure in a zone in the gear chambers, the said reservoir communicating with one of the gear chambers through a lubricant feed inlet, a plurality

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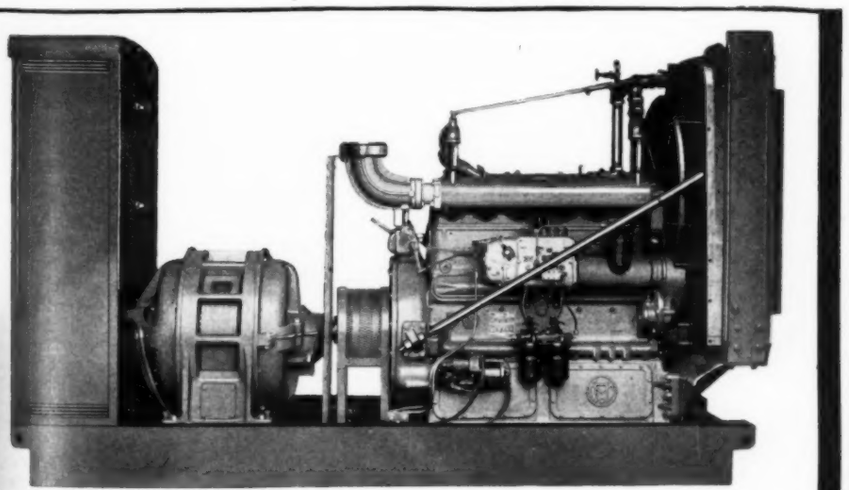

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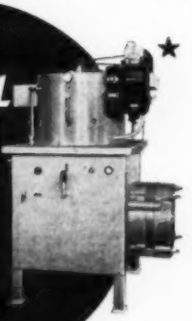

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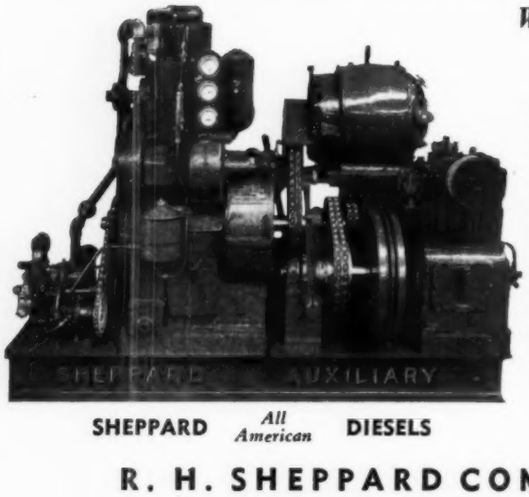

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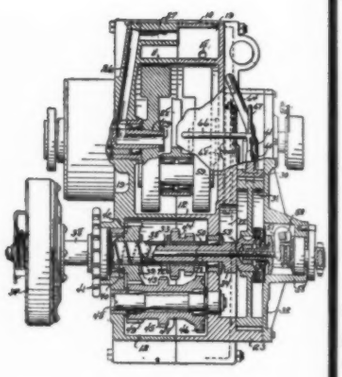


of lubricant conducting lines connected w an outlet of the said pressure zone, a pas for returning lubricant from the transmis chamber into one of the gear chambers for circulation, and means for automatically c trolling the pressure in the lubricant distri ing lines.

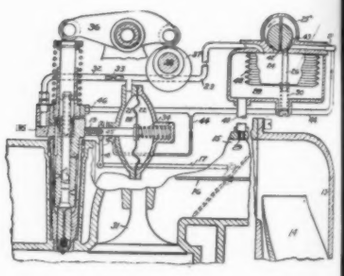
2,290,921

FUEL INJECTION SYSTEM

Stanley M. Udale, Detroit, Mich., assignor George M. Holley and Earl Holley.

Application July 5, 1940, Serial No. 344,

7 Claims. (Cl. 123—140)



1. In a fuel injection multi-cylinder engi having an inlet valve and an individual inlet passage leading to each cylinder, an dividual throttle in each air entrance, an dividual engine-operated pump intermitten discharging metered quanttiies of fuel in each cylinder, a main fuel supply pump fe ing fuel to each of these metering pumps, pressure control chamber connected to sa fuel supply pump, automatic control mea for varying the discharge from each meteri pump comprising a fuel chamber, a movi wall forming one wall of said chamber a connected to said control means, a vacuu chamber on the other side of said moving wa a pipe freely connecting the fuel chamber wi the pressure control chamber, a restricted ou let from said fuel chamber leading to sa metering pump, pressure control means f said control chamber responsive to the pre sure in the air entrance on the engine side said individual throttles and adapted to mai

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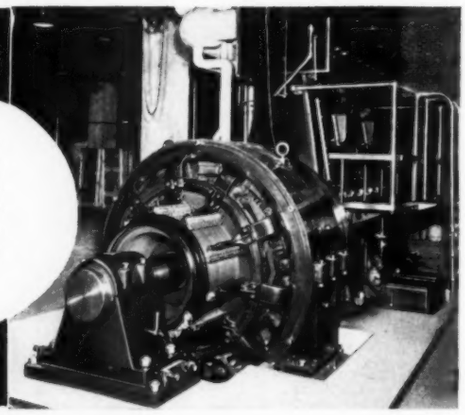

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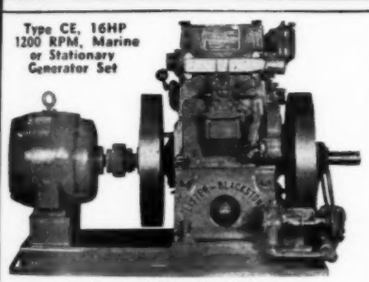

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tain the pressure in said control chamber at a constant pressure added to the absolute pressure of the air entering said cylinder, a compression spring in each of said vacuum chambers, said compression spring creating a pressure substantially equal to the pressure in the pressure control chamber said individual moving walls being also connected to said individual throttles whereby when each of the walls moves to admit more fuel as the pressure at the entrance to the engine inlet valve increases, the individual throttles are opened wider, and when each of the walls moves to decrease the fuel supply as the engine is throttled, it simultaneously throttles the individual air throttle to which it is connected and so throttles the air flowing to the inlet valve, a common air entrance, a throttle valve therein, and a supercharger located between said common air entrance and the individual air entrances leading to said cylinders.

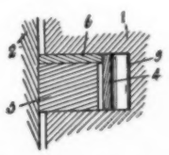
2,300,519

PISTON RING ASSEMBLY

Harold P. Phillips, Hastings, Mich., assignor to Hastings Manufacturing Company, Hastings, Mich., a corporation of Michigan

Application April 1, 1940, Serial No. 327,162

2 Claims. (Cl. 309—44)



1. A piston ring assembly comprising a split expansible cast iron main ring member initially and subsequently engageable with a cylinder wall throughout the full outer surface thereof, a thin split expansible auxiliary ring member of relatively soft non-ferrous ribbon-like lubricating metal such as bronze disposed in side by side relation to said main ring member in contact with the cylinder wall and being initially of a radial width exceeding the radial width of the main ring member, and an inner expanding spring of such axial width as to adapt it for coaction with both said ring members but initially acting only on the auxiliary ring member whereby said auxiliary ring is subject to relatively rapid wear during its initial use to deposit a film of metal on a cylinder wall through its frictional wearing-in coaction therewith.

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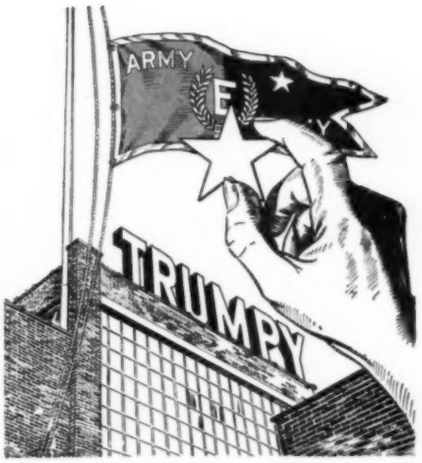

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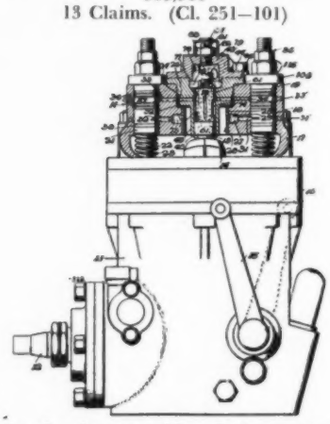
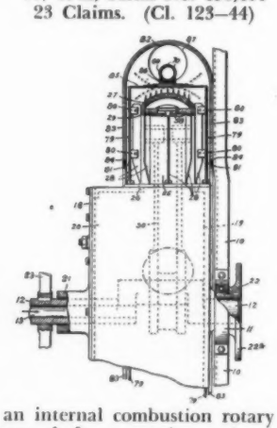
2,300,314
FUEL PUMP
Byron R. Pool, Harrisburg, Ill., assignor of one-half to Theodore Coleman, Mount Carmel, Ill.
Application January 15, 1940, Serial No. 313,961
13 Claims. (Cl. 251—101)



1. A valve for use with a fuel pumping and distributing unit comprising a valve cage having a valve seat therein and a series of passages leading from said valve seat, an expansible resilient rotary valve in said seat having a section of less diameter than said seat, a lug on said valve section to engage the openings of said passages and control fluid flow therethrough, and a second lug on said valve section diametrically opposite said first lug to maintain said first lug in sealing relation with said passages.

2,300,094
INTERNAL COMBUSTION ROTARY ENGINE
Leslie W. Beaven, Chicago, Ill.
Original application June 17, 1941, Serial No. 398,428. Divided and this application February 11, 1942, Serial No. 430,401
23 Claims. (Cl. 123—44)



7. In an internal combustion rotary engine, a stationary shaft; an engine casing rotatable thereon; a plurality of radially disposed cylinders on said engine casing and provided with exhaust ports; laterally spaced plates on opposite sides of and movable with said cylinders, said plates provided with air inlets and their spaced outer portions providing an annular outlet, said cylinders adapted to create air-currents between said plates in intimate relation to said cylinders and to discharge said air currents centrifugally through said annular outlet; thermostatic means disposed in the discharge path of the air currents and influenced by the temperature of said currents to control said annular outlet; and an annular manifold tube communicating with the exhaust ports of said cylinders and adapted to discharge the scavenged products of combustion into and to intermingle said products of combustion with said air currents.

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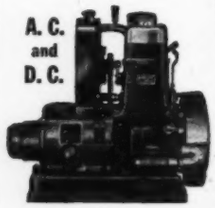

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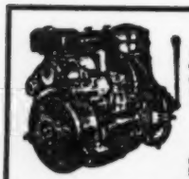

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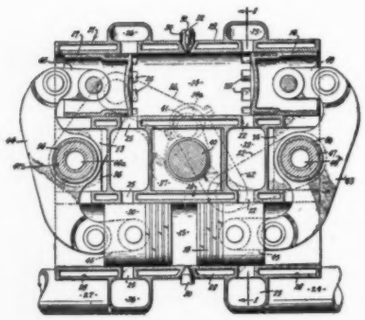
Application April 7, 1941, Serial No. 387,242

7 Claims. (Cl. 123—51)



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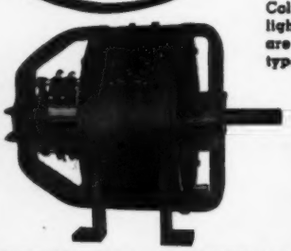

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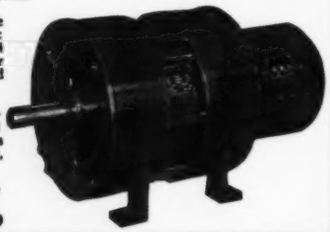

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